THE AMERICAN ENGINEER

OCTOBER—1943

In this issue:

POST WAR ENGINEER'S EDUCATION

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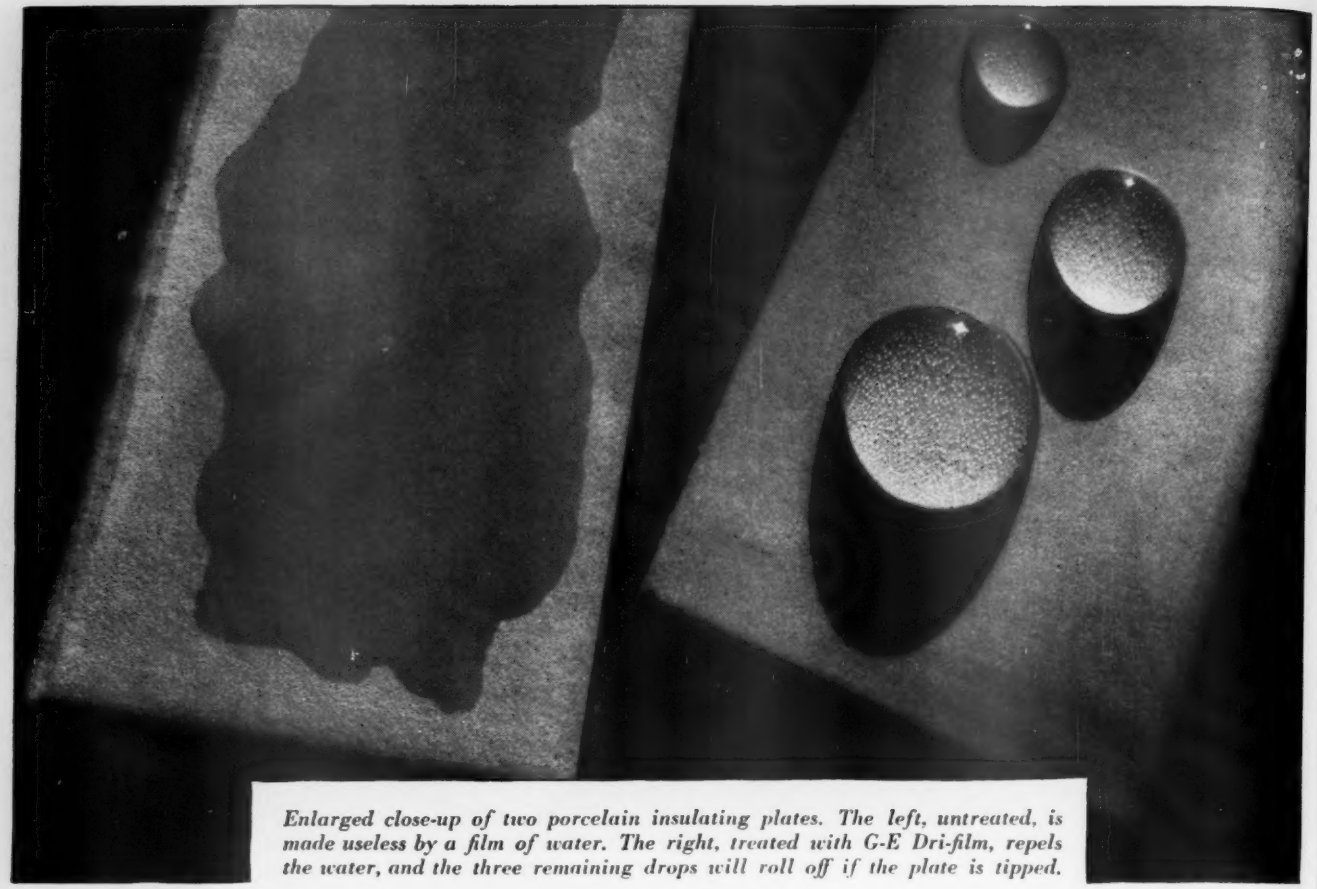
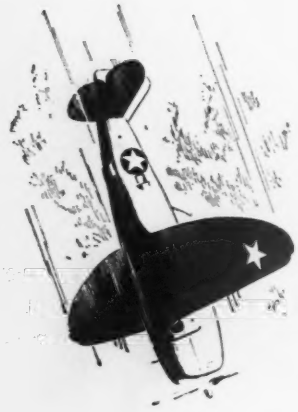


Enlarged close-up of two porcelain insulating plates. The left, untreated, is made useless by a film of water. The right, treated with G-E Dri-film, repels the water, and the three remaining drops will roll off if the plate is tipped.

How to cure a Flying Radio's LARYNGITIS



THERE USED TO BE a lot of trouble, every time an American pilot in a dogfight dropped a radio set 20,000 feet. Not crash trouble, for in the cases we're talking about the radio was in the plane and the pilot pulled out of the dive.

But sometimes the radio lost its voice. For the sudden plunge from cold to warmer air produced condensation of moisture—like the fog that collects on your glasses when you come indoors on a winter's day. A film of moisture formed on the radio's insulators; the film let the electricity leak away; the radio quit dead! And that was bad—since a modern fighting plane depends almost as much on its radio as it does on its wings.

But not so long ago General Electric scientists found a way around this difficulty. For if a porcelain insulator is exposed, for just a few seconds, to the vapor of a composition called G-E Dri-film—then the whole nature of the insulator's surface is changed. It looks just the same, but moisture doesn't gather any longer in a conducting film. Instead, it collects in isolated droplets that don't bother the radio a bit. The set keeps right on talking.

Today the voices of most military radios are being safeguarded by treating their insulators with G-E Dri-film. And the research that cures a radio's laryngitis is the same kind that has licked the problems of the turbo-supercharger, and has packed the driving power of a destroyer into turbines not much bigger than a couple of trunks. It's the kind of research we're counting on, tomorrow, to turn the discoveries of wartime into peacetime products we can all use. *General Electric Co., Schenectady, N. Y.*

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THE AMERICAN ENGINEER

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MEMORIES THAT WILL LINGER AFTER THE WAR...

We take just pride that we are 100% dedicated to the war effort.

Our helpful contributions have brought us many valuable contacts — many new friends, who are also dedicated to the war effort.

To these we pledge loyalty and fidelity, and the best performance of which we are capable to the end that victory is facilitated.

To our other friends and customers we assure new products of outstanding merit, when the time comes.

To those who do not know us, if you have a product of merit that demands *PRECISION* engineering, tooling and machining, we would like to see whether it fits into our manufacturing and marketing methods.

Tell us about it, and we will discuss it leisurely as time permits, for the duration.

SILVER CREEK PRECISION CORPORATION

Lawrence Schmitt, President

Silver Creek, New York

The Engineer

ACHIEVEMENT AND SACRIFICE ON BATTLEFRONT BRING ACKNOWLEDGMENT OF DEPENDENCE FROM EVERY ARM OF SERVICE

And Expressions of Gratitude From All

An Heroic Symbol In the Making — Perhaps.

Elsewhere in this issue is an illustrated story concerning a little known branch of the armed engineering forces of this nation — the Engineers of the famed Marine Corps. In every arm of the Military Service engineers are present and wherever the land, sea or air forces may be the engineer paves the way to their achievements. All wars have required the predecessor of the modern engineer but no previous conflict has been so greatly influenced by, or dependent upon him, as the present holocaust.

Reams have been, and are being, written upon the role of the engineer in every battle area of this Global Conflict. Nor have the praises and panegyrics been confined to the pages of engineering publications. Newspapers, magazines, radio commentators and official communiques have emphasized over and over again the contributions and sacrifices of the Military Engineer.

Although the Italian campaign is but weeks old, unusual tribute has already been paid to the heroic qualities of the fighting engineer on that front. In a recent brief editorial, a New York newspaper does more to link engineers with achievement, sacrifice and fame than a thousand opening ceremonies, commencement addresses or Society awards.

Strangely, the ways of peace, which he has promoted with equal vigor and success, have failed to produce for the engineer that honor, respect and tradition which pertains to the black robed representative of Justice, to the white clad disciple of Escalapius or to the mitred Theologian. Perhaps the symbolism of the engineer as a heroic and legendary figure may yet be born of the welter and blood of Carnage enthroned. Tragic indeed is the accounting of mankind to its benefactors.

Engineers, unable to serve in the Armed Forces, would render a real service to their profession, and to their professional brethren who are daily placing themselves on the sacrificial altar of mortal combat, by publicising, reprinting and distributing the following editorial from the New York Times of September 17th:

"The Engineers

"'Many American engineers have died in the Italian beaches': so begins a dispatch from a correspondent with the American Fifth Army. It may remind us a little of how much our armies and our country owe to this branch of the service. Landings on those beaches were effected by the engineers. They are husky fighters when they take up the role of combat engineers. On the Italian beaches they had other work to do and they died doing it. The number of parts they play, the number of jobs they are called upon to go through is incredible to the layman. They are masters of many trades, men-of-all work as well as men-at-arms.

They lay and unlay mines, dig trenches, run railroads and railroad shops, make bridges, roads, fortifications, airports, bomb-proofs, gun emplacements, barracks, anything buildable. They map and camouflage. They are photographers and cinematographers. They incinerate refrigerate, disinfect. They are first-class plumbers. They attend to the water supply. They are expert handlers of explosives and all tools, including a rifle and a bayonet. One of their favorite sports is tossing a flame-thrower at a pillbox.

This isn't a catalogue; it's only a hasty selection from the accomplishments of our engineers. They are real Yanks of the Yankeeist kind. We can't be too proud of them."

Engineering Societies and Chapters should cherish and keep alive this public acknowledgment of the role and achievement of the engineer as an heroic figure in American - yes World - history.

Possibly the marriage of Mars and Pax, performed through the good offices, and firmly held in the restraining clasp, of the engineer, might serve to symbolize the latters' control over both.

MARINE CORPS ENGINEERING

LITTLE PUBLICIZED ACTIVITY INDISPENSABLE TO THE ACHIEVEMENTS OF FAMED SOLDIERS OF THE SEA

Story Prepared by Sergeant H. Hurwitz — U.S.M.CO.
Submitted by Sergeant E. A. Shiebler — U.S.M.CO.

AUTHENTIC PHOTOGRAPHS OF RECENT PACIFIC ACTIVITIES—BY THE U.S. MARINE CORPS

A Marine Corps tank, nicknamed, "The Blizzard", by its crew is lowered by the side of a ship to a barge for a trip to Guadalcanal Solomon Islands.

Probably the most unsung branch of the United States Marine Corps, that versatile group of fighting men who are setting the pace on the drive to Tokyo, is the highly skilled division known as ENGINEERS.

Wherever you find a unit of the Marine Corps, regardless of its size, you'll find some Engineer personnel. This long-laboring, hard-fighting crew played a vital role in the capture of Guadalcanal, in the defense of our securely held outposts in the Pacific and in the construction of new bases both in Continental United States and abroad.

Modesty and efficiency has long been the trait of these experts. They fight with infantry units, they accompany Raiders and they prepare maps for attack. And they don't brag about it. There's hardly a phase of Marine Corps activity with which the engineers aren't connected—and the Leathernecks are the most versatile of all fighters.

One of the finest engineering feats by Marines was at Guadalcanal during the first major offensive by the United Nations in the South Pacific. Engineers accompanied the first wave of Leathernecks that landed in the Solomons. Their deeds during the invasion will give the layman an insight as to the variety of tasks assigned to this little known branch of the Marine Corps.

Each landing party contained a special unit of Engineer personnel, ready to blast their way through any enemy obstruction encountered—find and destroy enemy mines—and do any of the myriad of duties that fall to the lot of Marine Combat Engineers. They were called upon to establish unloading points and storage dumps on the beach. Landing facilities were constructed. Organizations, equipment, and supplies were routed to the forward battle areas.

Going further inland, Marine Combat Engineers fought alongside infantry in capturing what is now known as Henderson Field. This Japanese planned airfield was practically completed when the Leathernecks took over and Marine Corps Engineers finished the job. The engineers were hardly started on the construction completion when they were called upon to advance to the front lines to expedite traffic into the interior.

In the erection of bridges and the construction of roads, Marine Corps Engineers had little except natural material with which to work. Later, their portable saw mill was handy in preparing lumber. A lot of standing timber was

Among the American improvements applied to the Guadalcanal airfield after it was wrested from the Japanese was this steel mat which facilitates take-offs and landings of such big planes as the U. S. Army B-17 shown here. The mat is laid in small sections and is easily repaired.

A student in the Marine Aerial Photography Interpretation School matches up two maps under the stereoscope.

Marine tractors "hit the surf" as they are driven off landing boats to established an outpost of Uncle Sam in the South Seas.

found unsuitable as it was thoroughly impregnated with our shrapnel. At one spot, a sturdy bridge foundation was essential for the transporting of heavy material and the ingenious engineers conceived the idea of employing a couple of amphibian tractors for supports.

Another early problem was that of water supply. The Engineers had to construct and maintain a water supply system. The so-called "hairy-eared" men had to seek and demolish all types of enemy traps as well as install our own traps and camouflage. The work of enemy bomb disposal, destruction of enemy duds, removal of general field obstacles, the construction of shelters and electric power facilities all were carried out by engineering personnel.

The training of this engineering talent is thorough and speedy. Enlisted personnel are interviewed at Marine Corps "boot camps" for engineering backgrounds and those selected are sent to an engineers training battalion for training in organizational problems. Outstanding students are then sent to specialist schools of the Marine Corps. Selected Marines are also sent to leading Army, Navy and Civilian Engineering Schools for advanced study.

Excellent opportunities are extended to the men in the ranks for advancement and officer's training. Because so many lives depend upon their work in the field, officers are given extensive training before being assigned to combat duty.

For men interested in engineering activities on the fighting front, the Marine Combat Engineers offers the perfect answer. Each day brings with it a new challenge to ingenuity, courage and responsibility. But the feeling of accomplishment runs high among these Marines who are playing such a significant role in paving the victory road to Tokyo.

Here's a neat job of camouflage showing a 50 caliber gun in a coast position in the Solomons.

United States Marines move in to new positions across a sturdy temporary bridge built by Leatherneck engineers soon after the successful attack on Guadalcanal Island.

POST WAR EDUCATION IN A POST WAR WORLD

CONDITIONS, PROBLEMS AND PROPOSALS ORIENT THE FUTURE OF HIGHER EDUCATION PARTICULARLY THE TRAINING OF ENGINEERS

As Envisioned By

DR. EDWIN S. BURDELL — *Director*
Cooper Union for Advancement of Science and Art

(From an Address Delivered at The Wisconsin X Club Forum)

DR. EDWIN S. BURDELL
Director
Cooper Union for the Advancement of Science and Art, Teacher and Administrator

The America of tomorrow will be a tougher America. Tougher in the sense that it will be more realistic. During the war years it will have returned to its earlier virtues — virtues of self-denial and self-sacrifice, of faith and charity. It will have recognized that it cannot live a life of luxury, isolation, and indifference while peoples of other nations are struggling against economic insufficiency and social chaos. It will be more realistic since it will recognize that inequality of opportunity within its own borders cannot exist without creating unbalance that tips easily into booms on one hand or depression on the other. It will be an America more resourceful in creating fuller employment. The America to which our youth will return from far-off battlefields must be one of sufficiency and opportunity, of challenge and fellowship—one that finally gives meaning to the loosely-used phrase—the American way of life.

Education, which is essentially the preparation of youth for life, will not only have to reorient both its objectives and its techniques to this new world but will have to be broadened in scope and availability. Its level must be raised above the now tenth-grade army average, lengthened beyond the now conventional age group of six to sixteen years, and deepened beyond the present level of vocationalism.

Pre-war education has been faced with the following problems: how to obtain more realistic objectives; how to enable more boys and girls to reach an adequate level of attainment; how to give meaning to the classroom by tempering theory with practice; how to make education an on-going process beyond Commencement Day. Post-war education will find the answer to these problems in large measure by adopting the so-called "cooperative form" of education at the high school, junior college, and college levels. More realistic objectives will be attained by closer collaboration with industry, trade, and commerce. More boys and girls will reach an adequate level of attainment because they will "earn while they learn", and therefore, overcome personal and family financial difficulties. More meaning will be given to subject matter because by alternating class work with shop or office, theory will be translated into practice. Finally, the length of any given school or college program will be extended thus giving time for maturity of thought and creation of a new pattern of life in which study and work are carried on simultaneously.

The cooperative scheme sharpens the focus of any educational program. It gives vocational orientation to the thousands of young men and women who "don't know what they want to do when they get out of college or high school." It provides systematically coordinated instruction in principles, and practical training in application. It exemplifies that deep and necessary union of theory and practice which is so characteristic of contemporary thought — which is so much emphasized by pragmatism, instrumentalism, and scientific-humanism alike. Let us be able to say of our trained engineer, for example, what Santayana has said of the truly rational man: "He is constituted by ideas which have ceased to be visionary and actions which have ceased to be vain."

Strictly speaking, I suppose there is "nothing new under the sun," but cooperative education as it is known today is generally credited to Herman Schneider, late Dean of Engineering at the University of Cincinnati. He started his plan of cooperative education in 1906, when twenty-seven students who wished to obtain practical experience concurrently with their study of technical theory were admitted to courses in mechanical, chemical, and electrical engineering. Under this cooperative plan, a carefully coordinated schedule was arranged, whereby the student for six years alternated classroom instruction at the University

with work in industry. Groups exchanged places each week so that both the school and the shop were always fully manned.

In the thirty-seven years that have elapsed since then similar plans have been inaugurated in twenty-five other engineering schools. The new Technological Institute at Northwestern University in Evanston and the Stevens Institute of Technology at Hoboken are among the most recent and most distinguished schools to adopt this pattern.

It seems obvious that the cooperative student obtains an insight into labor problems and a knowledge of the reactions and psychology of the working man —an insight which is denied the full-time student whose adult associations are limited largely to his parents and instructors. He comes to understand the problems of the men whom he will subsequently direct. The best time for the young man to try to acquire an unbiased point of view in labor relations is while he is still young. The graduate is not likely to have either the opportunity or the willingness to do so. Furthermore, the student learns to get along with others, to work under supervision, to follow instructions, and to abide by the decisions of his superiors. Thus, from the discipline of obeying instructions, he learns to direct the work of others. In general, he is brought to a proper appreciation of the human factor in practical affairs.

Similarly, in the case of mechanical engineering, students who have worked with the various machine tools do not need voluminous textbooks to tell them what these machines can do. This system of cooperative education develops judgment rather than captious criticism. A freshman working in a large organization or sharing in a modest capacity in the building of a bridge realizes quickly how little he knows. He gets the value of clear-cut knowledge as against fluid generalizations. His perspectives begin to lose their distortions. The cooperative system teaches an engineer to do his best naturally and as a matter of course.

I believe that the higher receptivity of students who alternate study and practical experience is due mainly to two factors: First, the young man in industry has already found himself. He knows what he wants, and he has reason to believe that he has the ability to absorb an engineering education. In short, he has demonstrated to himself and to the school authorities that he has that quality so difficult to define — engineering aptitude. The other factor is the effect of suitable employment which promotes understanding in the branch of engineering in which the young man has enrolled. The technical schools of the future in their search for ways of meeting the demands upon them at the same time that their resources are dwindling will probably find that in the cooperative system more students can be handled and laboratories maintained less expensively, thus reducing the dollar investment per student in buildings and equipment. Of course, some of these savings may be offset by the cost of maintaining an efficient staff of coordinators, but such costs in personnel may be more readily controlled than the costs involved in depreciation and obsolescence of expensive buildings, machinery, and equipment which at best only approximate their industrial counterparts.

With respect to "filling up the gap" in the professional field created by promising young scientists who left graduate training to go to war I predict that American industry after the war will create industrial leaves of absence to enable such men to complete their scientific education either on a full-time or part-time cooperative basis. This idea is to be found in Prime Minister Churchill's recent message to the British Parliament in which he said, "We must make plans for part-time release from industry so that our young people may have the chance to carry on their general education and also to obtain specialized education which will fit them better for their work." I heard the same idea expressed the other day by the president of one of the largest oil-producing and refining companies in the United States. He was commenting on the growing scarcity of engineers and physicians for the oil industry and on the fact that there were no young men doing graduate work during wartime. Inability to make replacements and to provide for expansion in the scientific and technical field, he pointed out, would soon hamper seriously the progress of the oil industry. He indicated that industry generally would, after the war, in its own interest, have to give special opportunities to young men of promise. All this adds up to closer and closer coordination of education and the needs of the community which supports it.

Satisfactory contact between the engineering faculty and the cooperating industries may not only stimulate cor-

Editorial Comment

The concern of educators for the future of American Colleges and Universities is a topic of daily discussion. Press, radio and public forum give constant expression to the ever increasing realization that the scholastic training of the past generation manifested a fetish for form and ceremony, oft times to the detriment of public as well as individual development. From the battlefronts of the world come the impacts that will produce definite changes in the orientation of living and learning. Men on the firing line learn the emptiness of form without substance to an extent unappreciable by those who have never suffered the physical and mental anguish of mortal mass combat. A lifetime of scholastic education cannot equal the effect of a year in the trenches and foxholes of a battlefront on the young man between 18 and 30. In a recent plea for a change in American higher educational methods and objectives, Dean Howard Mumford Jones of the Graduate School at Harvard stated: "Far-sighted Army officials, as disturbed as you or I, are doing all they can to maintain both moral and intellectual standards and beliefs in forces hastily raised and feverishly trained. But the Army cannot do in twelve months what the schools have failed to do in eighteen years, and this disturbing testimony indicates that we are in too many cases sending American youth who are intellectually blank into a struggle which is quintessentially and tragically a struggle between two philosophies for the control of the whole human race. We equip our men superbly with weapons; we have not equipped them superbly with ideas."

An innovation of the most striking kind is to be found in the recent act of ancient, conservative and peerless Oxford in granting degrees to more than a score of prisoners of war who have never trod the cloistered halls of that famous institution of learning. These graduates have been interned in German Prison Camps for the past four years and have completed the requirements of the University by means of barrack study, correspondence, mutual assistance and prison lectures. Placed on their honor, and with the Red Cross in Switzerland as liaison agency, these men are today alumni of famed Oxford. And who from this side of the Atlantic will be the first to presume to the role of critic.

In the discussion here reproduced, Dr. Burdell, who has established himself as one of the leading educators of the country, presents some interesting thought provoking views on the subject of Post War Education. He is an ardent advocate of increased study in the humanities for engineers. Doubtless there are those who differ with his points of view. The American Engineer welcomes opinions on the subject of Education, particularly Engineering Education. In fact one might well inquire—Education—What is it? What are its possibilities? Is it a panacea for everything socially unsatisfactory?

porate and individual gifts to the school, but most certainly will stimulate the teaching staff to keep pace with technical development in the field. Teachers of applied science who are overburdened by heavy teaching schedules and administrative details often find that meetings of their professional societies do not offer sufficient first-hand contact with changing methods. However, if they are preparing students for early performance in industry during the college course, they will have to be alert to current industrial practice. The college administration will be forced to lighten the routine burdens and give the teachers time and opportunity to keep abreast of their fields.

Another important innovation will, I venture to say, be year-round operation of colleges, and certainly of our engineering schools. Many state universities already operate on a quarter plan, and each year they are offering a more complete fourth or summer semester. Traditionally, "summer school", especially in engineering institutions, has been rather a bleak affair, patronized largely by students who had failed to pass subjects required as prerequisites for the fall term courses. In the liberal arts colleges and state universities, public school teachers found scattered offerings which when "added up" over eight or nine summers entitled them to the master of science or the master of arts degree. Under wartime conditions, "summer schools" are a more normal part of the college program because they had to become "emergency semesters.

I do not advocate a continuation of the present accelerated programs instituted to meet war needs. I do advocate, however, a more flexible college calendar which will make it possible for students to recoup their health, their finances, and gain practical in-service training either within the cooperative education framework or without. With the great variations in climatic conditions over the United States, I can see no reason why the months of July and August must necessarily be considered "vacation months" for everyone everywhere. Winter vacations either skiing in the mountains or sun bathing on southern beaches may appeal to students and teachers more than the present conventional summer vacation.

Teaching staffs, of course, must not be called upon to face a twelve-month academic year with rest periods on a catch-as-catch-can basis. If college teaching is to be anything more than mere routine guidance through cut and dried subject matter, the members of the college instructing staff must have opportunity for keeping themselves fresh and alert professionally. Hence, private colleges which anticipate year-round operation should look forward to adopting the "quarter off" system which already works successfully in the state universities now on a four-semester basis. A member of the teaching staff may expect his non-teaching semester during any one of the four quarters which usually correspond to the four seasons of the year. For teachers whose professional interests may take them into out-of-the-way places, the possibility of being able to select the best season of the year for their researches will be welcomed. For those who wish to study or teach occasionally at other institutions, the possibility of selecting one or more quarters out of four will give greater flexibility to an exchange of talent between institutions of higher learning, a custom which should become more and more widespread.

Coming back to cooperative education, I see no reason why this form of education may not apply as readily to the liberal arts as to the schools of engineering and commerce. The liberal arts college needs to be less isolated from contact with the community. This applies to staff as well as to students. I never have had any faith in the mysterious light which was supposed to come into the life of a young man or woman immediately upon commencement day at a liberal arts college, a light which would be a safe and sure guide to a successful vocational as well as social adjustment in the world. I am assuming, of course, that every boy and girl must work to live and, therefore, I can see no danger in having their thoughts turning occasionally toward the problem of earning a livelihood as they pursue pure science and the humanities. Some people learn by reading and argument, others by putting theories to the test. It may help students in a liberal arts college to derive full meaning from such pure science subjects as physics or mathematics to see those principles at work in the outside world. If the application of the principles to be found in "the hundred great books" could be seen and heard as well as read about, we would add vitality to contemplation. They say that "a rolling stone gathers no moss, but that it has a lot of fun." Why not have the fun of finding oneself vocationally at the same time that one's character and mental horizons are being developed on the liberal arts campus? If education is a process of finding oneself, of unfolding latent talents and unsuspected capacities, the greater the variety of life's experience during the impressionable college years the better.

I readily concede that a truly liberal education develops a critical and inquiring attitude of mind, a willingness to put one's knowledge to the test of investigation and thorough study. It is based on the confidence that the mind of man can be used in the discovery of truth; that with human reason we may go forward in our endeavor to understand ourselves and our world. But this approach to truth and ultimate values need not be exclusively through the application of deductive reasoning in the field of philosophy, religion, the languages, literature, and the fine arts. An understanding of nature and human nature can also be achieved through inductive reasoning which is characteristic of the study of mathematics, physics, biology, chemistry, and the social sciences and their application to human needs. There is no need for a Darwinian struggle for existence between the various educational fields or disciplines. Let each contribute what it can and let them be brought together in a more or less philosophical synthesis. Our efforts toward such a synthesis at The Cooper Union we like to call "Scientific-Humanism."

(To be concluded)

THE MACHINE – ITS EFFECT ON SOCIETY

SOME REFLECTIONS UPON CRITICS

TOGETHER WITH CERTAIN FIGURES TO REFUTE THE CONTENTION THAT MACHINE CIVILIZATION ENSLAVES

By Dr. John J. Caton

This is the third portion of Dr. Caton's article on the machine. In it he elaborates further on the subject of the machine—a blessing, not a curse to mankind—and submits evidence in support of his arguments. Quoting from the editorial comment in the August issue—"perhaps... will sufficiently hearten engineers to make a more aggressive disavowal of the abuses of the machine resulting from the selfish applications of those who, through ignorance or design condemn the creative efforts of scientists and engineers."

4. *It Destroys Health of the Worker*

This criticism is not only not true, but there are ample facts to prove it is not true. England is one of the most industrialized countries in the world. We are told there are 55,000,000 people in the British Isles and only 3,000,000 farmer. Too, they have been using machines longest. The census of England has been carefully kept longer than elsewhere, also. In looking into the British census, we find these classes listed in order of their healthfulness: Glue and Fertilizer workers; Electrical workers; Preachers; Gardeners; Farmers; Teachers; Doctors; Lawyers; Authors. The authors were so hard at work writing about the machine killing men, they were the unhealthiest class in the lot! It is true that the number of men in the glue and fertilizer factories constitute a small number relatively, but there are the facts.

In this same connection, Mr. Ecker's Metropolitan Life Insurance Company, not so long ago gave out the 'lowest death rate in history' among his industrial policy holders. This act is too bad for critics. Indeed, they rely upon opinions for their conclusion and have a way of avoiding facts. But Abe Martin says somewhere in his collection of classical nonsense that, 'It is funny how a man with facts can break up an argument'.

Health! Look at the linotype machine. It was invented in 1887. By 1903, there were 7,500 of them in this country. When the machine was invented typesetters worked 14 hours per day. By 1903, the hours had been cut to 8, the wages were up 20 percent, and the death rate down 30 percent. This machine, you see, proved to be good for the physical health, it provided more money to buy books and pursue 'creative art' interests, and gave typesetters 6 additional hours every day in which to do it. Since the physical health is close to mental health, I suggest that the critics of the machine take up some machine employment, get their livers going, and thus cure themselves of so much choleric nonsense.

5. *Machine Causes Accidents*

This charge is true only where men are careless and misuse the machine. It is not true, in general. I know a thread concern which has gone more than 10,000,000 man hours without a loss-time accident. I also know that Cheops used 100,000 men, 600,000,000 man hours to build one pyramid and killed 20,000 men in the operation. I know a cement mill which has been going some 36 months without a loss-time accident.

The Mediterranean fleets used to depart amid the tears of every relative aboard the boats. Depending upon stars and "patched canvas bellying to the breezes", and the wind, it was expected, and was the rule, that the loss of life would inevitably be great. Now, with the compass, steam, and the propeller the danger has been eliminated.

But it is argued, the automobile is very dangerous. The automobile is not dangerous. The drivers are. And yet, on the basis of actual miles travelled per passenger, I have no doubt if the figures were available it would be shown that the auto is no more dangerous than the horse and buggy of another day.

6. *The Machine Puts Men Out of Work*

That the machine makes men work less is the glory of the machine. It does shorten the hours of labor. It does give men necessary leisure for cultural hobbies and "creative art" pursuits. It gives men more leisure than masses of men ever before had in the history of mankind. But that it "throws" men out of work is just another figment of the imagination of clever people who love to turn a phrase. It is another one of "those self-evident truths" which is not so.

How do we arrive at the conclusion anyway? As we always reach error, by examining the first half only, the method generally followed, I am using English government statistics:

In England in 1769 it took 320 men to weave as much cloth as one man could weave in 1840. But by 1855, after Arkwright and Colmant had gotten busy on the machine, just fifteen years later, you see, one man could weave as much cloth as 700 men could weave in 1769. Now the average critic of the machine civilization looks at these figures, dips his pen, and proceeds to ask the colossal question, "Now, what I want to know is, what did you do with the 699 men?"

Well, it is a very good question as far as it goes. But the critic should have pursued his statistical studies

a little further. If he had taken the time to do this he would have discovered, to his amazement perhaps, but greatly in the interest of truth, that in 1830 there were exactly 195,000 persons in England working in textiles. That by 1914, there were exactly 689,000 persons so engaged. That the population in 1830 was 23,028,000 and by 1914 this had grown to only 45,221,615. Then if the critic had been interested in truth more and literary effects less, he could have announced that as the population just doubled, workers brought into the textile industry multiplied three and a half times. He then could have turned a clever phrase with truth in it. Something like this: Englishmen were not criticizing the machine, they were busy teaching savages to wear pants, and then weaving the pants.

Similar figures hold for all fourteen major engineering trades of England. Time does not permit the citation of them, but it is a fact that between 1871 and 1911, a period of great technological development, and one of comparative normalcy, because the World War had not upset the world, the fourteen major engineering trades employed 235,584 persons. By 1911 these same trades employed 602,407. Thus it appears that as the population of England grew 30 percent, those gainfully employed in only 14 major engineering trades, the very place where machines had been most rapidly introduced increased 260 percent.

Printing in England offers an interesting comparison. In 1871, there were only 66,071 persons working at the printers trade. By 1911, this had grown to 184,075 persons. Too, they were printing the very stuff which claimed machines were throwing people out of work. Again for this same period, mind you, while the population increased 30 percent, those brought into the printers trade increased 300 percent. The answer is conclusive as it relates to England. But what about our country? Machines have thrown people out of work here surely? Let us have a look at the record.

Perhaps no country in all the world has had the rapid technological development we have had in this country since 1870. This was the beginning of the mechanization of our industrial techniques. Between 1870 and 1930 our population increased 218 percent (and it should be pointed out here that up to the middle of the last century our population increased twenty times as fast as it ever did anywhere else in the world), but while our population was increasing only 218 percent, those gainfully employed increased 291 percent. In 1875 we had 324 persons out of every 1,000 employed. By 1930, we had 400 persons out of every 1,000 employed.

Our most rapid technological development has been since 1900. If any single period of our history would show machines throwing men out of work, this is the period. But since 1900 we have created 200,000,000 new jobs while our population increased only 47,000,000. Today, there are 422 persons out of every 1,000 employed.

Those industries employing the nearest normal number of men today are the more highly mechanized. We find such industries as Automobile, Textile, Paper, Printing, and other highly mechanized industries back to normal and employment, and some slightly beyond. Such industries as building, service trades, foundry, heavy machines and machine shops requiring, as they do, more skilled men are under normal employment. In short, just where the most work is today is just where the most machines are being used. The Department of Labor shows that on consumer's goods 9 out of every 10 who were at work in 1929 are now at work. Whereas, in heavy goods such as steel, cement and building only 7 out of 10 are employed.

A significant fact generally overlooked by critics of the machine is the number of new jobs the machine creates. One out of every seven factory workers today is making products his grandfather never saw. The 18 major industries in this country today are wholly new since 1880. These alone employ a million persons and there are additional millions producing and processing raw materials for them and in selling and servicing what they make. It is reliably estimated that one in every four workmen today owes his job to one of these 18 new industries.

It is the growing occupations that add workers. The vanishing industries are losing workers. In ten years between 1920 and 1930, the 19 principal growing industries gained three times the workers the 19 vanishing ones lost. In 1930, for instance, there were 321,322 fewer draymen and stable hands, than there were in 1920. There were 134,000 fewer wheelwrights and diesetters. 75,000 fewer dressmakers in the homes and 74,000 fewer blacksmiths. The total loss of the 19 declining industries amounted to 800,000 persons. But for the same period the gain in the 19 growing industries was 3,250,000! We picked up, for example, in that time, 687,000 truck drivers and chauffers, 356,512 mechanics, and so on with the other growing industries.

The critics never take into consideration what the machine has done to prevent child labor. In 1900, one out of every 5 children between the ages of 10 and 15 was employed. In 1930, less than one out of every 20 was so employed. This is good altruism on the part of the machine.

Why do we invent machines, anyway? The critics say, without exception, to save labor. Quite the contrary is true. Only 16 percent of the more than 2,000,000 patents in Washington can be classed as covering labor saving machines. The other 84 percent are definitely labor creating machines. The critics do not seem to understand how the machine can always make more and at the same time increase the number employed. Yet it is very simple. The machine improves the quality of the product. Note the auto. Decreases the cost. Note the auto. And spreads the products to ever increasing millions of people. Note the auto. It takes more people with machines to make 23,000,000 automobiles than it did to make 75,000 by hand. The price of the early car was five times as much as the modern car and the car was only one twentieth as good.

What has the machine done for wages? Wonders. Real wages can be only truly estimated in terms of purchasing power of goods. On this basis, wages more than doubled

(*Continued on Page* 27)

FORBIDDING SCENE IN THE BLEAK ALEUTIAN ISLANDS
WHERE ENGINEERS, AS ELSEWHERE ON THE FIGHTING FRONT, HAVE
MADE POSSIBLE THE SUCCESS OF THE AMERICAN ARMED FORCES

FORBIDDING SCENE IN THE BLEAK ALEUTIAN ISLANDS
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Submitted as:

ITEMS OF GENERAL INTEREST

SECRETARY OF N. S. P. E.

To Visit A Dozen States Within Month

Appended herewith is the itinerary of Executive Secretary Larson for the month of October.

Place	*Day*	*Date*	*Time*	*Via*	*Hotel*	*Remarks*
lv. Washington, D. C.	Th.	Sept. 30	11:25pm ET	C&O	Kanawha	Annual Meeting
ar. Charleston, W. Va.	Fri.	Oct. 1	9:50am ET			W. Va. Soc. of P.E.
lv. Charleston, W. Va.	Sat.	Oct. 2	11:46pm ET	C&O	Netherland Plaza	Stop-over
ar. Cincinnati, O.	Sun.	Oct. 3	7:00am ET			
lv. Cincinnati, O.	Mon.	Oct. 4	8:45am ET	Sou.		Conf. with Officers of K.S.P.E.
ar. Lexington, Ky.	Mon.	Oct. 4	9:35am CT			
lv. Lexington, Ky.	Mon.	Oct. 4	10:40pm CT	Sou.		Forum on Organization of Ga. So.
ar. Atlanta, Ga.	Tues.	Oct. 5	11:15am			
lv. Atlanta, Ga.	Wed.	Oct. 6	12:15am	Sou.		Conf. with M-A-L Fox & Nelson
ar. Birmingham, Ala.	Wed.	Oct. 6	5:30am			
lv. Birmingham, Ala.	Wed.	Oct. 6	10:15pm	Frisco		
ar. Memphis, Tenn.	Th.	Oct. 7	6.45am			
lv. Memphis, Tenn.	Th.	Oct. 7	7:35am	M.P.		Meeting of Ark. Soc. of P.E.
ar. Little Rock, Ark.	Th.	Oct. 7	10:37am			
lv. Little Rock, Ark.	Fri.	Oct. 8	2:15am	M.P.		Mtg. Sabine Chap.
ar. Beaumont, Tex.	Fri.	Oct. 8	5:28pm		Beaumont	Mtg. San Jacinto Chap.
Houston, Tex.		Schedule being arranged by Texas Society			Rice	Mtg. Bexar Chap.
San Antonio					St. Anthony	Mtg. Travis Chap.
Austin					Stephen A. Austin	Mtg. Dallas Chap.
lv. Dallas, Tex.	Tues.	Oct. 19	9:40pm	Sante Fe	Baker	
ar. Ft. Worth, Tex.	Tues.	Oct. 19	10:30pm			
lv. Ft. Worth, Tex.	Tues.	Oct. 19	11:20pm	Sante Fe	Skirvin	Meeting of Okla. Soc. of P.E.
ar. Okla. City, Okla.	Wed.	Oct. 20	8:30am			
lv. Okla. City, Okla.	Th.	Oct. 21	6:45am	Sante Fe	Jayhawk	Conf. with M-A-L Hagadorn, Munger, Rector
ar. Topeka, Kan.	Th.	Oct. 21	12:33pm			
lv. Topeka, Kan.	Fri.	Oct. 22	2:00pm	U.P.		
ar. Kansas City, Mo.	Fri.	Oct. 22	3:45pm			
lv. Kansas City, Mo.	Fri.	Oct. 22	4:25pm	M.P.		
ar. St. Louis, Mo.	Fri.	Oct. 22	10:10pm			
lv. St. Louis, Mo.	Sat.	Oct. 23	11:32pm	N.Y.C.	Lincoln	Annual Meeting N.C.S.B.E.E.
ar. Indianapolis, Ind.	Sun.	Oct. 24	4:15am			
	Mon.	Oct. 25				
	Tues.	Oct. 26				

Remainder of trip and return to Washington dependent upon final date set for annual meeting of Missouri Soc. of P.E. and N.S.P.E.

NATIONAL COUNCIL — STATE BOARDS ENGINEERING EXAMINERS

Council To Meet

Indianapolis, October 25 and 26

The Quarterly Registration Bulletin of the National Council lists the program of the Annual Meeting which, cancelled in 1942, will be carried out in streamlined fashion this Autumn. According to the Bulletin:

"The Annual Meeting of the National Council of State Boards of Engineering Examiners will be held at Indianapolis on Monday and Tuesday, October 25 and 26 in the Lincoln Hotel. The meeting will be streamlined and only important business transacted. Among the subjects to be considered are amendments to the Model Registration Law, procedure for expediting the registration of 'Engineers-in-Training,' activities of the National Council during the post-war period, code of ethics, and interstate registration.

At the last Annual Meeting a resolution was adopted to the effect that the National Council's Certificate of Distinguished Service be awarded at the next Annual Meeting to all the engineer members of State Registration Boards who have served on a Board for twenty years or more and, in accordance with this resolution, these certificates will be presented at the Annual Dinner.

Committees that wish to meet previous to the meeting of the National Council may do so at 4 p.m. Sunday, October 24. The Board of Directors will meet at 8 p.m. Sunday, October 24. The program for the two days of the Annual Meeting is as follows:

Monday, October 25, 1943

9:00 a.m.—Registration of Delegates and Visitors
10:00 a.m.—Business Session
12:30 p.m.—Lunch
2:00 p.m.—Business Session
5:00 p.m.—Meeting of Zone Groups for Nominations
7:00 p.m.—Annual Dinner

Tuesday, October 26, 1943

9:30 a.m.—Business Session
12:30 p.m.—Lunch
2:00 p.m.—Business Session
5:00 p.m.—Meeting of Board of Directors

Member Boards should appoint delegates as soon as possible and promptly furnish the Secretary with their names. State and national engineering societies are cordially invited to send representatives. The Lincoln Hotel should be advised direct by delegates regarding the type of room desired and time of arrival. It is also suggested that railroad reservations be made as early as possible. At the Annual Dinner informal dress will be in order in keeping with the times.

The 1942 meeting of the National Council was not held and at that time it was understood that the postponed meeting would be held in 1943 at the same place. The question of whether or not the meeting should be held this year has been given due consideration by the officers of the National Council and, after receiving the advice of various parties, it was decided to proceed with arrangements. It will be necessary to elect an entirely new group of officers, with the exception of the Past President, and to transact other essential business, therefore, it is important that the Member Boards be well represented so that these matters may be disposed of in accordance with their wishes.

The following excerpt is taken from the message of President Knipmeyer, published in the June issue of *The Registration Bulletin*:

'Our meeting this fall merits the earnest effort of all Board members to attend. There are routine matters requiring our careful attention for action. Many highly important committee reports are to be heard, discussed and digested. Much new material and many new questions and conditions in these extraordinary times will need to be presented. A free exchange of ideas within our group was never more desirable and never gave more promise of helpfulness to us individually and collectively and to Council and its relation to professional engineering and public welfare. In spite of seeming difficulties of attendance we should be on hand and make this meeting one of the most wholesomely satisfying in all of Council's history.'

Code of Ethics

(Secretary's Note:—The following excerpts from correspondence of Past President Virgil M. Palmer with Dr. Donald C. Jackson, Chairman of Engineers' Joint Committee on Ethics, will be of interest to the readers of The Registration Bulletin who have been following the development of a code of ethics for the engineering profession. Mr. Palmer submitted the two drafts of the code of ethics to some young men and, while we agree with the preference given by these young men, we also agree with Mr. Palmer's viewpoint that 'counsel from someone is of no value unless the person giving the counsel is competent through natural aptitudes, training and experience to give it.' Dr. Jackson, who has rendered valuable service to the engineering profession in connection with the Engineers' Joint Committee on Ethics, has expressed the following views, 'There might be a difference, for instance, between legal relationships which would enable a state board to cancel a registration and the ethical formulation under which a state board could caution or even reprimand a registrant. I think probably the ethical formulation ought not to be planned to come into the statutory structure of any state.' In this connection we are publishing the article from the *New York Times* entitled 'Medical Ethics Discussed,' referred to by Mr. Palmer).

From letter, dated August 4, of Mr. Palmer to Dr. Jackson:

'I got the reactions from nine of my young men as to the short concise Code of Ethics and the longer, expanded Canons. Six men preferred the shorter Code. Two men thought that there should be a short, concise code of principles followed by an expansion like the Canons. The remaining man thought that if we would all abide by the Ten Commandments, there would be no need for an Engineers' Code of Ethics and that if we must have one, make it short. In my thinking, the benefit I get from a check of the young engineer is to find out how much consideration they have given to the question of ethics both in their schooling and in their practical every day experience. In weighing the value of their opinions, I always recall one of the principles stressed by Harrington Emerson in his Twelve Principles of Efficiency, namely, the principle of competent counsel. From a mature viewpoint, I would not consider either these young engineers or students competent counsel as applied to this matter.

'I am enclosing, herewith, a photostat of a letter which appeared in the *New York Times* of July 2. This has to do, as you will note, with the question of Medical Ethics. It so clearly differentiates between legal violations in the practice of Medicine in contradistinction to violations of Society ethics, that I thought it worthy of careful consideration.

'As I said before, the purpose and use to which our Code is to be put must be an important consideration back of the formulation of a universal Code of Ethics for Engineers.

'Referring to the Digest of State Laws Governing the Practice of Professional Engineering and Land Surveying, compiled and published by National Council of State Boards of Engineering Examiners, 1941, you will note that the Model Law, as well as forty states and one territory require Good Moral Character as one of the requirements for license or registration. Furthermore, at least ten states, namely, Alabama, Connecticut, Georgia, Iowa, Kansas, Kentucky, Nebraska, New York, Rhode Island, and Texas, have a code of ethics which is used in connection with registration, or have adopted a code which is to be so used. Minnesota has a proposed code which is in the process of adoption.

'Referring back to the photostat, as I see it, there must be a code which can be used as a practical tool in connection with legal accountability for unethical professional engineering practice. Such a code should cover principles and be short, pithy and directly to the point. In addition to this, for Society or other

usage, there can then be the longer expanded code, such as the Canons as rearranged and recommended by the American Institute of Consulting Engineers, which you enclosed in your letter of July 24. This type of arrangement, it seems to me, will work out all right. I cannot conceive of State Boards having registrants as professional engineers subscribe to an abstract of anything in connection with their induction into the engineering profession.

'I think this does not get us into a condition of having two codes, but rather it implies the adoption of the short code covering basic principles for use by the boards in a legal control over the profession and then the expanded Canons of Ethics, comprehensive in character, for use by the engineers in interpreting the principles and their applications.

'I emphasize the legal application of the Code, because I feel that this phase is the place from which must come the most definite progress and recognition of the profession. As you have already pointed out, codes have been in existence in the engineering societies for a long time but with a dearth of real material benefit as yet from them.

'It is my feeling that while you and I appear to look at this whole question from two different viewpoints, really we are much closer together than appears at first.'

MEDICAL ETHICS

Violations In Some Instances Become Subjects For Court Action

To the Editor of the *New York Times*:

The matter of medical ethics discussed by Edward G. Griffin in his letter published June 23 is put in a confused status by his failure to separate ethical transgressions that are in no sense illegal from ethical violations that are also legal violations. The latter are truly for the courts to try, as any other violations of the law are tried, whether committed by professional — legal, medical, ecclesiastical, engineering — persons or non-professional persons.

The criminal acts are tried in criminal courts. Ethical violations not involving any legal violations are tried before the offending doctor's fellow-physicians and are punished by reprimand, suspension or loss of membership in a medical society.

Mr. Griffin forgets that members of the legal profession are ipso facto officers of the court, and they are responsible to the court for their actions. But they may be guilty of some violation of the rules or ethics of the bar association and not necessarily be disbarred, even though dropped by their professional organization. Indeed, lawyers are not obliged to belong to the bar association any more than doctors are required to join the medical association. For the medical association, whether county or state to expel a member is one thing; to cancel his license is another.

Physicians are licensed to practice medicine under the general police authority vested in the State. It is only the State that can revoke the license, and that only after due trial and conviction. For instance, a consultant might be grossly unethical in criticizing treatment in use in the case in which he was consulted, in front of the friends or relatives of the patient and the attending physician. Surely Mr. Griffin would not suggest that a reprimand of the unethical consultant by his medical society should be replaced by a court trial and revocation of the consultant's license and deprivation of his means of livelihood!

The professional man who does not belong to his own professional organization is not subject to discipline for ethical violations by his fellows. If he commits a criminal act, he is subject to trial in court as is any other citizen—George R. Harris, M.D., Pittsburgh, Pa., June 24, 1943.

—*New York Times*, July 2, 1943.

BRITISH COLUMBIA

PROFESSIONAL ENGINEERING SOCIETY

Issues New Journal

Volume One, Number One, of "The Blueprint" the official publication of the British Columbia Engineering Society has just made its appearance. The name is descriptive of the cover which is a veritable blueprint, and which lists in addition to the usual advices the following table of contents: A Message from the President; Editor's Page; The Second Mile; Dominion Council of Professional Engineers — Annual Meeting; General Principles of Post-War Economy — London Chamber of Commerce; Members on Active Service; By-Laws — British Columbia Engineering Society.

A. D. Creer is the Editor of the new publication and W. H. Hill, H. C. Anderson and P. B. Freeland comprise the Editorial Board. The Business Manager is W. E. G. MacDonald. The Editorial Office is located at 929-718 Granville Street and the Business Office at 16-555 Howe Street. (While nothing so specifies, it is assumed that Vancouver is the City).

To quote from the Editor's Page:

"The Blueprint" makes its bow to the public in general and to the "Engineers" of the Province of British Columbia in particular. Its ultimate success will depend more on what it gives than on what it gets. It hopes to appeal to all readers who are realists and who are trying to think constructively and with an engineering mind, to get down to hard facts and to avoid the emotional quicksands of much of the past thinking.

We, using the word editorially, shall get, we hope, a great deal of criticism. We have had some already — the name "Blueprint" is hackneyed, most unsuitable, etc., etc. We don't agree; to us the word "Blueprint" represents graphically a well-thought-out, definite idea, that can be discussed and substantiated, that is based on scientific thinking and not on hopes or fears or beliefs or convictions. These are excuses to avoid thinking and reasoning. If this does not satisfy the critics, we can claim to have picked up the idea from one, Winston Churchill, who is a pretty good man to follow these days.

Our policy will not be set and static, it will be dictated by our readers. Our ambitions are high, we aim to give to the many engineers an outlet for the expression of their thoughts and opinions, reasonable and constructive ones we hope, and not only to the engineers but also to the many industrial groups of which engineering is an essential part.

* * * * *

It should be remembered that under the British North America Act the control of Professionals is one of the duties specifically put in the hands of the Provincial Legislature, and although a certain amount of co-operation between the various Professional Associations has come about, notably in the case of the Canadian Bar Association and the Canadian Medical Association, the final and complete control in each province rests in the hands of the Provincial Associations.

* * * * *

One of the first activities of the Society is the publication of this journal, "The Blueprint."

Best wishes for success to "The Blueprint."

Fragments from

STATE & SOCIETY ACTIVITIES

INDIANA

Bulletin Notes

The September issue of the Indiana Professional Engineer devotes considerable space to personal notes in addition to comments on meetings and the subject of Post War Planning. Among the personal news items are the following:

It's Col. Cohen Now

The good news was recently received informing us that our former President as well as past National Director, Sultan Cohen, has been promoted from a Major to a Lieutenant-Colonel. We offer him our heartiest congratulations upon receiving this promotion which he so justly has earned and deserves. Col. Cohen, was in full charge of the construction work at Camp Breckenridge and that construction will be one of many memorials to his ability as a construction engineer.

B. A. Poole Promoted

B. A. Poole, State Sanitary Engineer, on leave of absence to the Sanitary Corps of the U. S. Army, has been promoted from a Captain to a Major. He has been transferred from Camp Campbell to the headquarters office of the Sixth Service Command in Chicago.

Captain Petty Transferred

Captain Ben Petty, National Director of the Society, has recently been transferred from his post at Columbus, Ohio, to Ft. Knox, Kentucky. We miss the good services and advice of Captain Petty, who is on leave to the Army Engineers from Purdue University, where he holds a professorship in Highway Engineering.

Sam Hadden Honored

Recognizing his sterling qualities as an administrator and his thorough ability as an engineer, the American Association of State Highway Engineers, at an executive board meeting in Chicago in June, elected as their First Vice-President, genial and mild spoken Sam Hadden, Chairman of the State Highway Commission of Indiana.

Sam had been serving as regular Vice-President for the Third District, comprising twelve middle Atlantic states.

We congratulate Sam upon receiving this high honor, and appropriately commend the A.A.S.H.E. for their wisdom in choosing for one of its high officers a gentleman who combines all the attributes of a capable engineer, an excellent scholar, an ardent student of Nature and human nature, a successful editor, an able administrator, an outstanding executive and a perfect gentlemen.

Don Bloodgood Now a "Prof"

Don Bloodgood, who has been superintendent of the Indianapolis City Sanitation Plant since 1936, resigned his position recently. Don has accepted a position at Purdue University as a teacher of sanitary engineering and to do research and extension work. Prior to coming to Indianapolis in 1929, he was a member of the Sewage Commission of Milwaukee. For seven years Don was assistant to C. K. Calvert, Superintendent of the Sanitation Plant in the City of Indianapolis.

Don has been one of our most active and dependable chapter members. His interest in the affairs of the Society has always been keen and we wish him a successful tenure as a "prof."

Ray Pike Appointed

Ray Pike, former Director of the Society, was recently appointed Director of the new State Economic Council, by Stephen C. Noland, Chairman of the Council. Legislation enacted by the 1943 General Assembly created the Council to make plans for the post-war period. Ray was engaged in private engineering in Cleveland for seventeen years, and later became assistant city engineer at South Bend which position he filled for eight years. From 1936 until recently he was engineer with the WPA.

Engineers Abroad

Sam McGurk is a member of the Seabees and is stationed at Dutch Harbor.

Bill Uhl is First Lieutenant in the Army Sanitary Corps and is somewhere in England.

Fred Farr, Jr., is First Lieutenant in the Army Sanitary Corps and is stationed somewhere along the Amazon River in South America.

Note—Members who have information regarding other members who are serving Uncle Sam outside the continental United States should relay such information to the editor for use in this column.

MISSOURI

State Society Aids N.S.P.E.

The Missouri Society has given wide publicity to the National Society Pamphlet recently issued by Secretary Larson.

From The Missouri Engineer one learns that, "The N.S.P.E. pamphlet enclosed with a recent issue of the MISSOURI ENGINEER has brought many inquiries concerning membership in the National Society. Some members have written directly to Washington requesting application blanks.

It is not necessary for any members of N.S.P.E. to submit an application form in order to attain membership in the National Society. It is only necessary for the member to signify his intention to join accompanied by one years dues of four dollars in a letter to the Secretary. A chapter member should request his chapter secretary to send in the dues payment. Until October 10, 1943 the State Secretary will be able to certify to the National Society concerning qualifications to membership. After that date only engineers registered in the State of Missouri may be certified for membership, and the letter application must include the registration number of the applicant.

Further information concerning membership may be secured by writing to the Secretary, Missouri Society of Professional Engineers, Box 365, Jefferson City, Mo."

What For Editorial

The recent editorial in The Missouri Engineer designated "Tally Ho" is a mixture of words and ideas that is somewhat baffling to the average reader. Curiosity appeals for an explanation of the following:

"TALLY-HO"

Last month we threw down the bars and gave to our readers (?) an anonymous letter by one "Mugwump", who dug up a few old bones and gnawed on them to his heart's content, we hope. Now we are in receipt of an acknowledgment of the Mugwump and hasten to print it to see what will happen next. In the classic words of the hunt, the quarry is scented—"Tally Ho".

Fellow Engineers:

Despite the apologetic preamble of the Editor of the Missouri Engineer, I wish to congratulate him for his courage and wisdom in publishing Mugwumps gripe. This is an old sore that needs airing now. If several issues of the Missouri Engineer were devoted in their entirety to pros and cons of the subject of what

should constitute professionalism in the engineering field, no greater service could be rendered for engineers.

Mugwump's gripe was just as true and frequently made, over forty years ago. I regret that he did not endeavor to offer a remedy along with the gripe. Most every engineer is familiar with his thesis, some know the answer but hesitate to divulge it because as yet popular opinion among engineers would not support it and further perhaps because the sclution would hurt the present standing of some of the old time friends of those who think they have the solution. Patience is a great virtue. The solution of the problem, through changed conditions, is much closer to becoming effective without too much hurt to those who would be adversely affected, than was the situation forty years ago.

Two twelve dollar words are esoteric and exoteric. Up to the present time most discussion of who should be designated a professional engineer have been in the exoteric field. I wonder if this is the time or occasion to speak esoterically. At the present time, even the existence of our so-called profession is at stake. It is challenged by unionism and in a short time to come by the war produced synthetic engineers. Regardless of the present States' Registration Laws a more stringent arbitrary line must be fixed by those engaged in the engineering field, on one side of which a man is definitely a Professional Engineer and on the other side of the line he is definitely not a Professional Engineer. Once this line is definitely fixed, States' Registration Laws can be amended to conform to it. Although this designated line must be arbitrary it should be of sufficient merit to command the respect of the majority of those on both sides of the line. The crossing of the line from sub-professional to professional should be attainable by those who are willing to put forth sufficient effort to attain the higher goal.

I refrain from speaking esoterically at present but if sufficient interest is shown by printed discussion of this subject of Professionalism in forthcoming issues of *The Missouri Engineer*, I might do so. May I suggest that those taking part in the discussion, "Pull no punches". Let's have expressed opinions on "What shall be the arbitrary line, on one side of which a man is entitled to be designated a professional and on the other side of which line men are not entitled to the distinction of that title."

Respectfully submitted,

Wampuscat

P.S. Editor, please define Wampuscat for the benefit of our City Boys.

EDITOR'S NOTE: We have searched high and low through all the available encyclopedias, dictionaries, outhouses and restrooms but have failed to trun up the real definition of "Wampuscat"—One helpful soul said he thought it was an animal that "wamped" around all day and tended to other business at night. Any assistance in this serious research will be gratefully received.

NEW YORK

Queens Chapter

Mid-Summer News Bulletin

Quoting from the first Queens News Bulletin to reach the Editor of The American Engineer within a minimum of two months after the material ceased to be news — "In order that the members of the Queens County Chapter may be fully informed of the activities of the Chapter, the New York State Society and the National Society, your officers have decided to issue a Mid-Summer News Bulletin.

The final report of the Fact-Finding Committee on Accessible Improvements was scheduled for presentation at the September meeting of the Chapter.

The Committee on Engineers in Training has been discharged with the thanks of the Chapter. Any further activities will be handled by the Membership Committee.

A new list of member engineers available for appointment as surveyors of unsafe buildings has been submitted to the Municipal Civil Service Commission. The Queens County Chapter Constitution and By-Laws are being reviewed with the objective of making them conform with the newly adopted Constitution and By-Laws of the State Society.

Information has been received that Second Vice-President, William H. Walker, now a Lieutenant Commander in the U. S. Navy, has been wounded in action overseas. The following paragraphs are quoted from a letter dated June 14, 1943 sent by Lieutenant Commander Walker to one of his associates.

> "Just a few lines to let you know that I am still alive and kicking although not any too good with my right leg just now, as I am recovering from four shrapnel wounds that came via of the 'Battle for Africa.' It was a great fight while it lasted and now it is finished we go back to the old war cry, 'Where do we go from here'. I bruise easily but heal quickly and working just as hard as ever. Although we have been through plenty, . . ."
>
> "I have been through plenty and so far so good. If my luck holds out, so much the better — plenty of thrilling and exciting experiences that I will tell you about later."

We hope that Lieutenant Commander Walker's recovery has been as rapid.

The Membership Committee of the State Society has begun a drive for new members. There are enclosed (1) a pamphlet stating the objectives and history of the National Society, (2) a reprint of a speech delivered by State Society President James F. Fairman before the Pennsylvania State Society; and (3) an application blank for membership in the Queens County Chapter.

It is suggested that these pamphlets be used in contacting professional engineer friends in the campaign for new members. From copies of correspondence recently received, it appears that the membership of the Ohio State Society is rapidly approaching that of the New York State Society which is at present the largest in membership of all the State Societies of Professional Engineers.

There is pending in Congress the Kilgore Bill, Senate Int. No. 702. 'A bill to mobilize the scientific and technical resources of the nation, to establish an Office of Scientific and Technical Mobilization and for other purposes.' This bill proposes fundamental changes in the practice of engineering and in its application defines scientific and technical personnel as follows: 'Scientific and technical personnel shall include all persons, excepting physicians and dentists, who have completed any course of study in any branch of science or its practical application or who have had not less than an aggregate of six months training or employment in any scientific or technical vocation'.

The State Society is on record with the National Society as opposed to the Kilgore Bill in its present form.

The bill is now in the hands of a Senate Sub-Committee."

(signed) W. C. Kochendoerffer

Karl Vanpel — President

Executive Secretary

Westchester

Notes from the September Chapter News include the following:

Lt. Commander Arthur Benline faithfully keeps in touch. The last heard of him was during June from "Somewhere in Algeria", which he says is full of sand and flies, worse than Perth Amboy. He hopes to get back by '44 via Tokio.

Membership

Chairman Keaveny states:—"We have a contest on our hands. Ohio State says they are going to beat New York State in membership in the National Society. Westchester Chapter will meet the challenge. We are aiming for a ten percent increase by 1944". It behooves all of us in the county to consider ourselves as part of the membership committee. It has been suggested that in each community, licensed engineers who are still non-members, be visited by two local members who between them should be able to present the case for the Society. This is merely taking a leaf from the practice of the early disciples who thus spread the Gospel.

Obituary

During July, Engr. Arthur Boniface of Scarsdale, one of the charter members of our Chapter, passed away. The sense of loss of Mr. Boniface's family is shared by the Chapter.

Albany Chapter

The following letter is self-explanatory and justifies the initial issue of the Albany News-Bulletin:

126 State Street
Albany, New York

Gentlemen:

In accordance with a recent request from our President, James F. Fairman, we are enclosing a copy of a bulletin representing our first real attempt at publishing an Albany County Chapter News-Bulletin. I hope it may be of some interest to you.

I shall be pleased to be placed on your mailing list for News-Bulletins issued by your Chapter.

Sincerely yours,
Clayton A. Miller, President
Albany County Chapter

News-Bulletin

This News-Bulletin from your President is frankly an experiment. It is to inform you of what has been going on during the summer recess, since your last regular meeting. If such a Bulletin is favorably received, a condensed one may be continued by your Public Relations Committee Chairman, Ken Fraser, as an insert along with the Monthly Meeting Notices from your Special Activities Chairman, Leonard F. Mayer. *Now then, just relax for a few minutes* from your strenuous war time duties, *read the News* and meet your officers and committee representatives before you chuck this into the waste basket.

Officers

Officers elected for coming year are as follows: President, Clayton A. Miller; Vice-President, E. J. Burnham; Sec'y-Treasurer, Thomas J. Byron (No. 1 Frear Ave., Troy, N. Y.); Directors (2 New), William J. Blaum (2 Year Term), Edward H. Sargent; Directors (2 Existing), Francis X. Bode (1 Year Remaining), Lester J. Naden.

Committee Appointments

In accordance with the Constitution and By-Laws of our Chapter, your President has appointed the following seven Standing Committees and one Special Committee. In making these appointments, he has endeavored to select Engineers representing as many engineering branches and job affiliations as was possible. These men are now very busy in their "bread-and-butter" jobs but they are also going to work hard for the best interests of the Albany Chapter, so give them the support they deserve.

Ethics and Practice

Edward E. Sheldon, *Chairman*
Harvey O. Schermerhorn
Albert C. Richards
Roy G. Finch
Ralph J. DeStefano

Special Activities

Leonard F. Mayer, *Chairman*
Ernest A. Fox
Wynant J. Williams
Leroy C. Hulburd
Ralph A. Bloomsburg

Legislation

Robert C. Wheeler, *Chairman*
Gardner C. George
Louis C. Hyatt
Edward H. Sargent

Candidates for License

Charles A. Bacon, *Chairman*
Robert B. Ellsworth
E. Kenneth Karcher
Russell Suter

Public Relations

James Kenneth Fraser, *Chairman*
Herbert C. Lasher
Arthur W. Moon

Membership

Leo B. Westfall, *Chairman*
John Haber
Wm. Orton
Thos. J. Byron
Donald H. Cloke

Year Book

Horace A. Bond, *Chairman*
Thos. J. Byron
Carl Peterson

Special Committee on Constitution

John L. Harvey, *Chairman*
Louis C. Hyatt

Meeting Dates and Place

Reserve the 3rd Tuesday in October, November (1943) and January to May inclusive (1944). Meetings at Aurania Club, 25 So. Allen St. Your Special Activities Committee is working on a program that will please. If you know of an extra good available speaker, tell the Committee. We have several new and distinguished members in the Chapter and we hope to see them at our October meeting. The gas situation is apparently easing and cars may be used to drive to Engineering Meetings.

Change of Address

In case you have a new business or home address from that listed in the 1942-1943 Year Book, please send your Secretary, Thos. J. Byron a correction at once.

New York State Society
Executive Board Meeting — June 19, 1943

Albany Chapter was host to the State Meeting of Officers and Directors called to order by the President, James F. Fairman. A detailed report of business transacted will be available at our October meeting. A few high-lights are as follows:

1. Albany Chapter members received two chairmanship appointments on the four standing committees, namely: Clarence W. Post—Chairman Membership Committee; Robert C. Wheeler —Chairman Legislation Committee.
2. Our Gardner C. George was chosen as Chairman of the 1944 Nominating Committee.
3. New State Constitution approved at Annual May Meeting. All members received copies of same.

   Note: In conformity with a state resolution your President has appointed John L. Harvey (Chairman) and Louis C. Hyatt as members of a special committee to review our Chapter's Constitution and By-Laws in the light of the new State Constitution and By-Laws, to draft such amendments as may be necessary and to recommend same to our Albany Chapter at its October meeting and (2) to submit same to our Executive Board for review and approval.
4. Engineers in Training, Purchase of Bonds, etc., discussed.
5. Your President offered a Resolution of sympathy for the family of our late member Captain Arthur W. Brandt of Albany Chapter who died June 11, 1943. It was adopted unanimously. Your Secretary Thos. J. Byron, has written the family in behalf of the Albany Chapter.
6. Our Robert C. Wheeler, Chairman of Legislation Committee, reported on Bill S.702 entitled "A Bill to Mobilize the Scientific and Technical Resources of the Nation, to Establish an Office of Scientific and Technical Mobilization and for other purposes". Your Society is opposed to this bill in its present form and regards it to be the most important bill of this generation so far as affecting the practice of engineering is concerned. Details of same will be given at the regular October meeting.

Head Line News

See enclosed booklet showing brief history and objectives of the National Society. Copies are sent to our membership and should be helpful in interesting non-members in our Society — Please read it and use it for that purpose!

State President Jim Fairman recently received a challenge from the Ohio State Society as follows: *"Beat New York in* 1943". The wager between the respective State Presidents is the *loudest necktie* they can find. We cannot let "Jim" down, so help our Membership Committee, headed by Leo. B. Westfall, to hold our line of existing members and secure sufficient new members to beat those "Buckeyes". We already have several prospects — turn in others to Leo and his Committee. If you are back in your *Dues*, get out your check book and mail them to Tom J Byron, our Secretary-Treasurer, 1 Frear Ave., Troy, N. Y. Your Chapter needs your support. If you are moving from this vicinity, don't sever your affiliations with Albany County Chapter — We have members scattered from New York City

to Ogden, Utah, and Coronado, California.

Working together our Chapter can accomplish much. We are counting on you.

Sincerely yours,
Clayton A. Miller,
President

Engineering Examinations

From Past President D. B. Steinman of N.S.P.E., member of the New York State Board of Examiners, comes the following comment on the first Engineer-in-Training examinations:

"Results of First Examinations for Engineers-in-Training

The first 'Preliminary Examinations' for certification of Engineers-in-Training were given in New York State in June, 1943. Of a total of 56 candidates who took these Preliminary Examinations, only 31 passed, or 55 percent.

Of the 25 candidates who failed, 5 failed only in Part I (Structural Planning and Design), 9 failed in Part II (Basic Engineering Sciences), and 11 failed in both Parts I and II.

In the complete examinations given at the same time for registration of Professional Engineers, 105 candidates appeared and 62 passed, or 59 percent.

A comparison of results in the separate parts of the examinations is as follows:

	Percent Passed	
	Professional Engineers	Engineers-in-Training
Part I	79%	71%
Part II	78%	64%
Part III (Engineering Practice)	63%	.....
Total Examination	59%	55%

These initial results do not appear to substantiate the earlier thought that young men fresh from college would do better in the written examinations. The better success of the more mature candidates may be attributed to the 'refresher' courses taken by many of them, and to the fact that the young men just graduating had no time to prepare for the examination. It is, however, disappointing to find that young men at the time of graduation have forgotten so much of what they studied in their Sophomore and Junior years. Future results will throw more light on these questions, and should be of interest both to engineering educators and to the profession."

COMMENT: Perhaps future examinations will provide the opportunity for a better judgment than can be formulated from a single instance. However, one cannot escape the thought that attendance at school and possession of knowledge are not necessarily equivalents. More important for an engineer than any application of theory is a thorough understanding of, and ability to use, the "Basic Engineering Sciences". Is it not suggestive, perhaps significant, that the greatest weakness appeared in the "Basic Sciences". The justification for complete examination of all candidates for the right to practice professional engineering is as complete as the justification for licensing them. The public safety demands both. There should be no lessening of requirements and no efforts to make Engineer-in-Training examinations class room quizzes. The Board of Examiners must protect the public by establishing criteria, not by accepting scholastic contentions or professions of skill or knowledge.

Erie Chapter

From the Erie County Chapter Bulletin comes the following:

October Meeting — Chapter Vice President, Norris Barnard, Chairman of Program Committee with the assistance of Major Cole and others, are planning our October meeting now. The subject "The Buffalo River Tunnel or Bridge, The Throughways and the Waterfront Railroad Problems". More detail on this meeting in next bulletin.

Washington Bulletin — The Kilgore Bill now in Congress which "Plans mobilization of technical and scientific manpower use in post war," has tremendous import. It treads on the professional engineers rights by offering without charge to any citizen, advice on engineering projects free of charge. Strangely, the physician's and dentist's fields of activity are exempt. We should oppose this bill.

The Fall Meeting of the New York State Society of Professional Engineers will be held in Binghamton on October 29th and 30th.

It is more than rumor that certain professional engineers in Buffalo are being considered for important political positions.

Meet our New Members: Elmer Hilburger, Engineer for Curtiss-Wright Corp.; Gene Eldridge, Engineer for Dunlop Tire & Rubber Co.; Warren Fortenbaugh, Engineer for Curtiss-Wright Corp.; Cam Ross, Engineer for Albert Kahn, Architects at Plant No. 2 of Curtiss-Wright Corp.; Leslie Forness, Engineer State Department Public Works.

Tri-County Chapter

Holds Mid-Summer Meeting

According to the "Tri-County News": "It has not been the practice of this Chapter to hold regular meetings during July and August, but this year circumstances altered practice.

On June 4th, the Board of Trustees of The Ohio Society of Professional Engineers passed the following resolution:

Kennedy moved, Fritchie seconded that President Graf bet the loudest necktie in his collection against the loudest necktie the President of the New York State Society can find in New York City that Ohio will beat New York in membership in 1943.

"President Fairman, rightly had so much confidence in the membership of the New York Society that he promptly accepted the 'bet'. Hence, your President, in order to prove the loyalty of Tri-County Chapter as well as to 'Beat the Buckeyes', called the Mid-Summer meeting.

"The necessary quorum of members being present, the meeting was called to order and passing over the regular order of business to the head of new business, the subject of increasing the membership was discussed. The consensus of members being that circularization, publicity and personal contact be employed, stress being given to the personal contact part of the program. Another supplemental activity in the same direction was to hold our regular meetings at suitable points in wider range than has been our practice in the past. To maintain interest in this membership campaign, it was decided that a meeting be held in August at some community in our field where there were a number of licensed professional engineers who were not now members of the Society, and invite them as guests of the meeting; and in that way get acquainted with possible prospects; thus giving our Membership Committee something to work on.

"It would have been remarkable if such a meeting was held without the subject of Post War Employment coming to the surface, and this meeting followed the customary practice. Several projects were suggested and ways and means of obtaining recognition and approval by the proper authorities were discussed. Space will not permit naming the suggested projects and their location, but these will be the subject of news in a future issue of TRI-CO NEWS."

Speaking of Neckties

Some men long for the soothing touch
Of lavender, cream or mauve,
But the ties I wear
Must possess the glare
Of a red hot kitchen stove.

The books I read and the life I lead
Are sensible, sane and mild;
I just hate spats,
I wear clam hats,
But I want my neckties wild.

Give me a wild tie, brother,
One with cosmic urge;
A tie that will swear,
A rip and tear,
When it sees my old blue serge.

Some folks say that a man's cravat
Should only be seen, not heard;
But I want a tie
That will make men cry,
And render their vision blurred.

I yearn, I long, for a tie so strong
It will take two men to tie it.
If such there be,
Show it to me . . . .
Whatever the price, I'll buy it.

Give me a wild tie brother,
One with lots of sins;
A tie that will blaze
In a hectic haze,
Down where the vest begins.

OHIO

President's September Letter

True to custom during the past two administrations the President's Monthly Letter is available for prompt reproduction.
Fellow Member of O.S.P.E.

Tempus fugit. It seems as if it were only yesterday when you honored me by my election as your president and our Society's fiscal year began. However, we have already entered the second half of my administration.

I am pleased with the progress we have made, although not satisfied. Much has been accomplished, but much more remains to be done.

It gives me pleasure to report that O.S.P.E. now has the largest membership in the history of the Society, but we certainly cannot say that we are satisfied when less than 18 percent of the Registered Engineers of Ohio are members of their professional organization. There remains much to be done in this field of activity if I am not to be made to surrender my most coveted (loudest) necktie. This is a job for each and every member, the Membership Committee alone cannot be expected to obtain the necessary and desired results.

The Executive Committee of O.S.P.E. and the Director of N.S.P.E. have worked at full speed during the summer months. Most of the standing and special committees are functioning and showing results. I am looking forward to active Fall programs by the local Chapters and trust that you will make it your business to take an active part therein. If you have any ideas as to what the Society should do, bring them before your Chapter at the next meeting, get the endorsement of the local group and have your Trustee present them at the next meeting of the O.S.P.E. Board of Trustees.

Yours for a bigger and better society,
/s/ Walter W. Graf
President

News Items

As with the President, the Committee on Publications for the Ohio Society is to be depended upon for constant and current news of the Society and its members. Its September Bulletin states:

The Fall season has arrived—witness the fact that your Board of Trustees met September 3rd for their "kick off" meeting. Yes, Prexy Graf was carrying the ball and still wearing that bright necktie he wants to keep.

Board of Trustees

Treasurer Shank reported that our total assets are $5,766.62. Robert N. Waid, a co-member on the Board of Registration with Prexy Graf, announced that Engineer Graf had received his reappointment to the Board of Registration. This makes the third Governor to honor Engineer Graf. Congratulations surely are in order.

Another great honor has come to Ohio. Past President of O.S.P.E. Professor Harry Nold of O.S.U. is the only candidate nominated for President of the National Society of Professional Engineers. He looks like a winner!! With this development it will be necessary for O.S.P.E. to select another National Society Director to represent Ohio. Director Nold told the Trustees, among other things, that the Kilgore and Mining Bills were being well taken care of. Minnesota and Porto Rico are new members of the N.S.P.E. Nominee Nold was guest speaker when Minnesota came in. (Have you read Engineer Nold's address in the August issue of the American Engineer? It will help to put your own ideas across to some prospective member.)

A. P. Harness, chairman of the Professional Practices Committee and member of the Violations Committee, reported that some six cases of violations were taken care of this past month. He intimated that something big was breaking. Jack Kennedy, past president, led the discussion that centered around contacts with industry. The Fisher Body Bomber Plant at Cleveland is considering the elimination of the word Engineer in the classification of its employees as a result of Engineer Kennedy's activities.

R. N. Waid brought to the attention of the Trustees the fact that many Engineers in the armed services are not being promoted because they are unfortunate enough to be in out-of-the-way places. A motion was passed to try and do something about this through a special committee.

Membership

We are on our way to beat New York and get a new necktie for Prexy Graf. We have 1863 members which is a new high water mark. The only discouraging thing is this — 588 of these members have not paid their 1943 dues. Come on fellows make the work lighter for that local secretary of yours and don't wait for that second and third dues bill.

The Southern Ohio Chapter, which has been a problem child for some time, is in there pulling again. Vice-President Fox helped the chapter get reorganized. The new officers who attended the Board of Trustees meeting in Columbus, September 3rd, are President P. E. Fuller, Treasurer, C. A. Hoffman, and Secretary E. S. Barrett.

New Members

Franklin County Chapter felt the brakes being applied to the membership drive in 1943 so its Board of Directors sent a resolution to the O.S.P.E. Executive Committee in August. The resolution requested that the chapters be allowed to collect dues for new members on a quarterly basis. Results!! O.S.P.E. By-Laws have been amended to read as follows:

> Article 1. Section 11—New members joining the Society during the second quarter of any year shall be assessed ¾ of the annual dues for that year. New members joining the Society during the third quarter of any year shall be assessed ½ of the annual dues for that year. New members joining the Society during the fourth quarter of any year shall be assessed ¼ of the annual dues for that year.

This should give Engineer Hoffman and his membership committee a new lease on life. Instead of the Fall season being our dormant period this year we should witness our greatest growth. Please understand this applies to the total dues collected—local, state, and national.

New Executive Secretary

H. N. Morris, secretary of the O.S.P.E. who recently received a commission in Seabees has resigned. Engineer Morris was an ardent promoter of the idea that the O.S.P.E. should have a full

time executive secretary. The Executive Committee could not see its way clear from a financial point of view to take this step even if one were available. It did the next best thing. It recommended to the Board of Trustees that a part time executive secretary be employed. Lloyd A. Chacey accepted the appointment to this job, effective September 1st. His pay is to be $50 per month and he was hired for the remaining part of the term of the present officers. Chacey, who plans to resign as president of the Franklin County Chapter, after expressing his appreciation to the Board for the confidence placed in him warned the members that this move would not mean less work for them but more work for everybody. Here is a copy of his letter of resignation to the Franklin County Chapter:

> "I hereby tender my resignation as president of the Franklin County Chapter to accept appointment as Executive Secretary of the Ohio Society of Professional Engineers.
>
> My association with this board has been most cordial and inspiring. My new task however calls for equal loyalty to all the 27 Chapters in this State of Ohio. I will watch with special interest and a little pride the future growth of the Franklin County Chapter. I will continue to depend on you and all my Engineer friends throughout this State to give me advice and counsel in my new undertaking.
>
> Faithfully yours,
> Lloyd A. Chacey"

Chapter Activities

Central Ohio—Reported by C. H. Wells—There were 72 present at this meeting at Hull Place. Sgt. Robert Ellis, of Lockbourne Army Air Base, Columbus, showed a graphic illustrative, epochal Nazi blitzkreig film. The title was "Divide and Conquer". The film was No. 3 in a series of seven in the Army Orientation Course. It recreated the "Mein Kampf" background, and then showed actual invasion pictures of Adolph Hitler's devastating march from Germany to Norway, Denmark, Holland and Belgium with the military and fifth column technique of warfare significantly set in logical patterns, accompanied by sound track. Though this story was gloomy yesterday, today it's another matter. Victory will be written with the blood of free men who have triumphed.

Both President Graf and Vice-President Rolph addressed the group.

Cleveland — "The Cleveland Engineer" — Engineer Harvey Hawgood has prepared a digest of the Kilgore Bill S-702, and it has been published in a recent issue of "The Cleveland Engineer".

Franklin County — Reported by Lloyd Chacey — "The Columbus Engineer" (the Chapter paper) contains a glowing report of what many think is a new idea in chapter activity. An inspection trip to the Columbus Army Service Forces Depot was combined with the inspection of a half million dollar highway project, and a "Dutch Lunch" to make the outstanding event of the year. Excerpts from the Columbus Engineer are:

> "Thanks to the resourcefulness of Captain Busey, Transportation Officer, our means of conveyance for most of the tour was a train composed of open sight-seeing cars, equipped with loudspeakers over which came the vivid descriptions of the various sections visited.
>
> First and of prime interest to those present was the Engineer Supply Section under the able direction of Major Quilliam P. Davenport, Engineer Supply Officer; open air storage; thousands of pieces of heavy equipment to delight the eye of the Engineer and, to supply maintenance parts for machines of war in all corners of the world; the only spare parts warehouse in the United States; over two hundred thousand items, from the smallest to the largest; more supplies; tires, four hundred thousand of them, all shapes and sizes; clothes pressed into bales to conserve shipping space, an amazing display of ingenuity, and, an example thru-out of what a free America can do when called upon."

PENNSYLVANIA

Pittsburgh Chapter

From the "Pittsburgh Engineer" comes the following:
Board of Direction—Second Thursday of each Month.
Chapter Meeting—Third Thursday of each Month.
Dinner—Roosevelt Hotel Coffee Shop, 6:15 P.M.
Meeting Roosevelt Hotel, 8:00 P.M.

Special Meeting—Pittsburgh Chapter Board of Direction

The Board of Direction of the Pittsburgh Chapter recently met at the Downtown Y.M.C.A. Engineers Fenelon, Aires, Bruun, Canfield, Finley, Houlihan, Janata, Knabe, Paine, Rice, Shoffner and Attorney Crawford of Brookville attended the meeting. Along with other business the Board consulted with and offered suggestions concerning proposed changes in the Engineers Registration Law for use of Engineers Shoffner and Paine, who will represent the Chapter at the meeting of the Legislative Committee of the State Society.

The State Society is making a study of the present law with a view of arriving at a decision as to whether changes are required and the nature of such changes.

The Board approved the appointment of a Post-War Planning Committee to cooperate with such committees being organized in the area. More of this at a later date.

Persons Exempted From Registration Under The Present Act

In order that it may be brought clearly to mind the exemptions provided for under the present act, Section 10 Act 415 is quoted.

"Persons Exempted from Registration. —The following persons shall be exempted from registration under the provisions of this act, to wit:

"(a) A person who is a resident of and has an established place of business in this Commonwealth, who shall have filed with the board an application for a certificate of registration, and shall have paid the fee required by this act. Such exemption shall continue only for such time as the board requires for the consideration of the application for registration.

"(b) A person not a resident of and having no established place of business in this Commonwealth, practicing or offering to practice therein the profession of engineering in any of its branches, including surveying, when such practice does not exceed in the aggregate more than thirty days in any calendar year: Provided, Such person is legally qualified by registration to practice the said profession in any of its branches, including surveying, in his or her own state or country in which the requirements and qualifications for obtaining a certificate of registration are not lower than those specified in this act.

"(c) A person not a resident and having no established place of business in this Commonwealth, or who has recently become a resident thereof, practicing or offering to practice therein for more than thirty days in any calendar year the profession of engineering in any of its branches, including surveying, if he or she shall have filed with the board an application for a certificate of registration and shall have paid the fee required by this act. Such exemption shall continue only for such time as the board requires for the consideration of the application for registration: Provided, Such person is legally qualified to practice said profession in any of its branches, including surveying, in his or her own state or country.

"(d) An employe of a person holding a certificate of registration in this Commonwealth who is engaged in the practice of the profession of engineering in any of its branches, including surveying, and an employe of a person exempted from registration by classes (b) and (c) of this section: Provided, Such practice does not include responsible charge of design or supervision.

"(e) Officers and employes of the Government of the United States while engaged within this Commonwealth in the practice of the profession of engineeering in any of its branches, including surveying, for said Government.

"(f) A person having no established place of business in this Commonwealth who practices the profession of engineering

in any of its branches, including surveying, exclusively as a regular employe of a public service company as defined in the Public Service Company Law, by rendering to such company engineering service in connection with its facilities which are subject to regulation, supervision, and control, in order to safeguard life, health, and property by the Public Service Commission of the Commonwealth of Pennsylvania, so long as such person is thus actually and exclusively employed and no longer: Provided, That such company shall have at least one engineer registered under the provisions of this act, in responsible charge of such company's engineering work in Pennsylvania."

It is believed that there is an agreement among all that exemptions under paragraphs "a, b, c, d, and e" are proper exemptions and are necessary for the operation of the act.

It should be emphasized that paragraph "d" contains a proviso. To quote: "Provided, Such practice does not include responsible charge of design or supervision.

Paragraph "e" concerns a National issue. Its correction if to come at all must come through an Act of Congress and until some correction is made by Congress each State Act will necessarily contain this exemption.

It appears to be almost the unanimous view of both the Board of Direction for the Pittsburgh Chapter and the Chapter membership at large, that the exemptions under paragraph "f" should be deleted from the Act.

The Warren Flood Reservoir

It is suggested that the Engineers of Western Pennsylvania investigate the recent report of the sub-committee on the proposed Warren (Upper Allegheny) and Conemaugh Flood Reservoirs.

This committee is a part of the Committee on Stream Pollution of the Pittsburgh Chamber of Commerce, Mr. Howard N. Eavenson, Chairman. The members of the sub-committee are Charles A. Finley, chairman; Charles Fox; E. A. Holbrook; Nathan Jacobs; and John M. Rice.

We quote from the report its conclusions and suggestions.

"The conclusions of this report are as follows:

"That the Warren Dam should be the next Flood Project constructed on the Allegheny Water Shed.

"That such funds as may be now available, by appropriation, for the construction of the Conemaugh Dam be transferred, augmented and made available for work on the Warren Dam.

"That both dams are beneficial in relieving floods, but the combined flood and pollution benefits incident to the Warren Dam should be given priority as a post-war construction project"

"It is respectfully suggested:

"That the Chamber of Commerce, through its proper officers, confer with the United States Engineers' Office, Pittsburgh, Pa., on the matters discussed in this report.

"That the Chamber of Commerce proceed to organize the Congressional Representatives from the districts affected and to call upon all communities along the Allegheny and Ohio Valleys to aid in accomplishing such legislation as may be necessary to give Warren Dam (Alleghany Dam) priority over the Conemaugh Dam as a post-war construction project."

Architects and Engineers

Mr. Searle von Storch, President of the Pennsylvania Association of Architects, Mr. H. L. Shay, Chairman of the Architects Committee, Mr. L. E. Moody, Chairman of the Engineers Committee, and your State President, met, during the summer, with Mr. Walter Scott, Deputy Secretary, Mr. A. Judson Warlow, Chief Engineer and Mr. Greiner, all of the State Department of Property and Supplies, for the purpose of discussing the report of the Joint Committee of Architects and Engineers having to do with professional services to be rendered by the Architects and Engineers to the Commonwealth.

The joint report was well received by the State Officials and after considerable discussion it was decided it would be advisable to hold a second meeting to present information and factual data in support of the commission fee rates as set forth in the report of the joint committees.

The members of the Joint Committee were as follows:

For the Pennsylvania Association of Architects; Harvey A. Schwab; Col. T. Henry Atherton; Howell Lewis Shay, Chairman.

For the Pennsylvania Society of Professional Engineers; H. M. Nelson; John M. Rice; L. E. Moody, Chairman.

Use of Title Engineer

It appears from the public press there is some misunderstanding of the Laws of the Commonwealth concerning the Practice of Engineering. It should be emphasized that the laws not only forbid the use of the title Engineer, but as well the performing of Engineering duties by a person not registered under the Laws of this Commonwealth. The change of title without change of duties does not legalize the action of the individual. The only remedy is registration or ceasing to perform the engineering duties.

A number of Engineers have moved into the Pittsburgh District lately. In case you are acquainted with any of these Engineers won't you kindly bring them to the Chapter meeting where they may have opportunity to meet and get acquainted with some of their associates in this area.

Harrisburg Chapter

C. Radford Berry Now Major U.S.A.

From Sparks one learns that Engineer C. Radford Berry has accepted a commission as a Major in the United States Army. He is at present located in the middle west, receiving preliminary training and will later proceed to the School of Military Government, following which it is expected that he will be associated with the military government of occupied territory.

Dikes and Dams

BY EDGAR A. WEIMER, SR.

An interesting commentary on the above subject has been prepared by Treasurer Weimer who was persuaded not only to prepare the draft, but to permit the editing of certain forceful expressions characteristic of the author. EDITOR

About 1884 I became interested in hydraulics under the guidance of my father and my brother-in-law, John Birkenbine, whose father was the foremost hydraulic engineer in this country and builder of Philadelphia's first water system. As a part of my education as an engineer, I spent considerable time and money building dams of all types on a rather large flood control project located on several farms acquired by my father in Schuylkill County for the purpose of providing me with an experimental area.

Flood control interested me to such an extent that I have made it a study from that early date up to the present. From 1900 to 1902, I resided along the banks of the Mississippi and Tennessee Rivers, and as this period was in one of the flood periods cycles, I had the opportunity of viewing the futile and anxious attempts of the Government to control these rivers by dikes or levees, expenditures for this purpose, I am told, amounting to not less than fifty million dollars a year from prior to 1900 to the present time. To be sure, it gives a job to about 3000 government engineers but the harm done trying to combat Nature's Laws, has never been given the study it should.

My failure to get engineers to look into the damaging side of the problem has only made me more positive that I am correct in my contentions. Nature provided bends in streams and rivers to retard or slow up the flow of streams. The flooding of lands provides retarding storage basins and maintains the fertility of the lands by depositing layers of mud on the lands by flooding the river valleys.

Egypt, the country that so far is the only one that can produce the long staple cotton used in the making of automobile tires, raises this cotton on lands that annually are flooded by the Nile River and the people of Egypt pray every year for the Nile to overflow. Here in this country we build dikes to keep the water from flooding the farms.

We have been warned that in the next seventy-five years the famous Mississippi Valley will become a barren waste, but who

(*Contiued on Page* 25)

The Machine—Its Effect On Society

(*Continued from Page* 12)

between 1900 and 1935. In 1934 the wage earner and the salaried employees received 67.4 percent of the national income. Between 1899 and 1929 production increased 216 percent while *wages to labor* increased 479 percent.

Criticism of the machine is sheer nonsense. Without it we could not possibly maintain the standards of living we now possess to say nothing of raising them higher. We enjoy many things now which just could not be made by hand. Automobiles and paved roads for example.

It is not numbers, but the amount of labor and energy that counts. If we did away with the machine, we could throw men out of work, and with all the increase of toil necessary, could never maintain our standards, even if all the able bodied persons worked 12 hours per day. It is estimated that it would take a total of 60 percent of our population to approach our present standards without the modern mechanization we now enjoy. But only 40 percent of the population ever work at all. Why, because the others are women and children!

Again, the critics say we are overproduced and that the machine is responsible for this. But we are told by the Bureau of Home Economics in Washington that to attain 'reasonable standards of living suggested by the Bureau' we will need to increase our *production* 75 *percent over what it was in* 1929. But in 1929 we were within 20 percent of our utmost capacity and still we lacked 75 percent of production enough to provide a reasonable minimum standard of living for our people!

In conclusion, the perfection of the tool marks the upward pathway of the race from the 'Stone Age' to now. Man has conquered nature by the use of the tool and the machine, a more complete tool. The machine has certain definite, tangible virtues. In the field of education it has reduced the physical facts of the world until today it is a neighborhood. It has been a boon to the toiler and has given him leisure for the first time in history, Psychologically, the machine demands attention. It takes more brains to drive an automobile than it does an ox cart. It certainly takes a different vocabulary, for I have tried both. To work with the machine, man must be alert, observant, full of action. Its comfort and its efficiency are something but the individual's reaction to it is more. Machine workers rarely go insane. Poets and logicians do that.

We live in a time of terrific indictment and feeble solutions. Our solutions are feeble because we are indicting the wrong things. I am not so disturbed about the machine, the profit system, capitalism, and systems of government, as I am about poor citizenship and the breakdown of moral and ethical character. This is much more serious than any temporary economic dislocation.

What we need today, is not so much criticism of the machine, but an intelligent effort on the part of the intelligentsia and the idealists to teach our people how to wisely use the leisure time the machine had provided for them. For the first time in human history a nation with 127,000,000 of people finds these millions with approximately eight hours of leisure time on their hands. If this is not the foundation for beginning the world's greatest renaissance, then indeed, where turn? Let's away with so much cynicism, and national wise-cracking, and be about our business."

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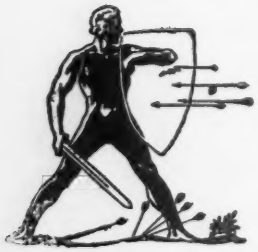

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has attempted to dissuade authorities from keeping the Mississippi River from flowing over the lands and fertilizing them with the rich mud that the river with its dikes is now carrying down into the Gulf of Mexico where it becomes lost forever.

As people, we become locally selfish when we allow or advocate the building of dikes to prevent the flooding of small sections of our town in which no building should ever have been built. Do we realize that by so doing we are burdening communities further down the river with an extra volume of water on top of the already flooded river instead of permitting this water to store itself naturally and flow off gradually.

Harrisburg had a thirty-three-year cycle flood in 1936. Some of the younger generation of engineers who will be here in, say, 1969, will experience the evil effect of the dikes built or being built on the upper reaches of the Susquehanna. Even before then minor floods will occur.

Engineers building flood control dams have failed to take into account the fisherman. Every such dam built, including the largest one above Pittsburgh, the construction of which I advocated, has proven a total failure for the reason that a flood dam should be kept normally empty and only be permitted to fill during floods. But the fishermen, who are not without political influence, demand that these dams be kept filled for their pleasure. So that is that.

In conclusion, if we refrain from building either dikes or flood control dams at flood times the people will have time to move to higher land and no lives will be lost. But if we hold the flood waters back with man-made dams or dikes and permit the people to feel secure in their homes, then when these dams or dikes break, the loss of life is shocking. Which should it be, people or property?

Dues

Dues are what make the wheels go round. Our standing as a Chapter is not too enviable with respect to this matter. Bills are being attached to a certain number of this issue of "SPARKS". If you have not paid your dues please lend us your cooperation by settling this obligation as soon as possible. If you receive a bill and have paid, turn your wrath the other way and remember we all make mistakes.

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WHAT'S NEW

And Coming In The Whirl of Change

(News from industry — gathered by the publisher)

REYNOLDS METALS COMPANY scientists have produced two types of aluminum yarn — Reymet, — to be used in combination with cotton, rayon, silk and wool for sweaters, drapes and other products, and Reyspun for weaving or knitting.

Through this process, one pound of aluminum can be stretched for 11,000 yards to make approximately 6 miles of glittering Reyspun of great tensile strength.

It is washable, never dulls or tarnishes, and can be drycleaned. What's more, it can be produced in any color one's heart could desire.

The machines in the Harrison, New Jersey plant of the company are ready to roll as soon as peace is restored. So, it's off into the post-war world we go, in our best aluminum gown.

BROR DAHLBERG, President of the Celotex Coporation, announces houses for everyone at $2500 — constructed with mass production methods — houses paid for through a nation-wide loan business to spread the risk of default and permit a low interest rate on housing loans.

"We have everything", Dahlberg says. "All we have to do is put the things together to make that post-war housing boom a reality." What we need is housing that will meet modern demands of cheapness, replaceability and livability. There is no reason why we should build houses to last forever — the average family doesn't need a house that long.

Houses should be constructed to last a minimum of 20 years, with part of the monthly payments set aside toward paying the cost of a new house at the end of the 20 years. In this way slums are prevented, since the neighborhood would renew itself every 20 years."

According to Mr. Dahlberg, the construction and real estate business before the war, were "merely crossroads stores working at the retail level. They must be integrated."

"What we have to do is to get the housing business into mass production. What's the use of building houses the same way they did in the middle ages, when we have all the tools and productive capacity to build them in a truly modern way."

Mr. Dahlberg stresses five things to be considered in relation to this housing problem: —

"1. People have got to want houses—and I think we can agree they will, after the war.

"2. The building industry as a whole must recognize modern methods of construction and distribution.

"3. The money-lender must recognize that lending money on houses is not a hazard that merits 7, 8 or 10% interest. I should say 3% would be the maximum interest rate — gross — allowable. The best security is the neighborhood itself, but through a mass-loan policy the risk must be spread much as life insurance companies spread the risk of their liabilities.

"4. We must consider the impact of modern transportation. You watch — the Helicopter will sweep this country, and we will have decentralized living. By that I mean people will not be tied to their machines— they can have a home for work and a home for play, and through the Helicopter can enjoy both, no matter what the distance — even 200 miles away.

"5. We must consider the impact of modern production. I predict a 24 hour work week after the war — with as much, if not more production, than we had in pre-war times. Right now, we can produce so much that this idea that man is tied so much to his machine that he must sleep and eat close to it — why, if that is to be our fate, we might as well call it a day right now."

"It isn't the hours you work, it's what you produce that counts."

LAWRENCE SCHMITT, President, Silver Creek Precision Corporation, Silver Creek, New York, makes the prediction that lifting devices after the war will make one man do the work of ten, and in addition minimize accidents and ailments and improve the general morale of workers.

Moving loaded barrels, heavy boxes, heavy pieces of raw material, from one place to another in a plant produces a surprising number of ruptures, strictures and sprains because of the emergency attempts of one or two men to do the work that should be done by lifting devices.

Mr. Schmitt states, "Insurance companies are interested in lifting devices to the extent they are willing to recognize the value of lifting devices in the rates covering accidents and compensation insurance."

While engaged presently 100% on war work, Mr. Schmitt states his company is prepared to produce and distribute lifting devices on a broad production and economical basis.

(*Continued on Page* 28)

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, Etc., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933.

Of American Engineer published Monthly at New York, N. Y. for October 1, 1943, State of New York, County of New York. Before me, a notary public in and for the State and county aforesaid, personally appeared Frederick H. Zurmuhlen, who, having been duly sworn according to law, deposes and says that he is the business manager of the American Engineer and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Congress 24, 1912 as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are: Publisher, National Industrial Publications, Inc., Post office address, 415 Lexington Avenue, New York, N. Y. Editor, Arthur V. Sheridan, Bronx County Bldg., Bronx, N. Y. Managing Editor, Arthur V. Sheridan. Business Manager, Frederick H. Zurmuhlen, 1941 Grand Central Term., N. Y. C.

2. That the owner is: National Society of Professional Engineers. (Non-Profit Membership Professional Society) Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

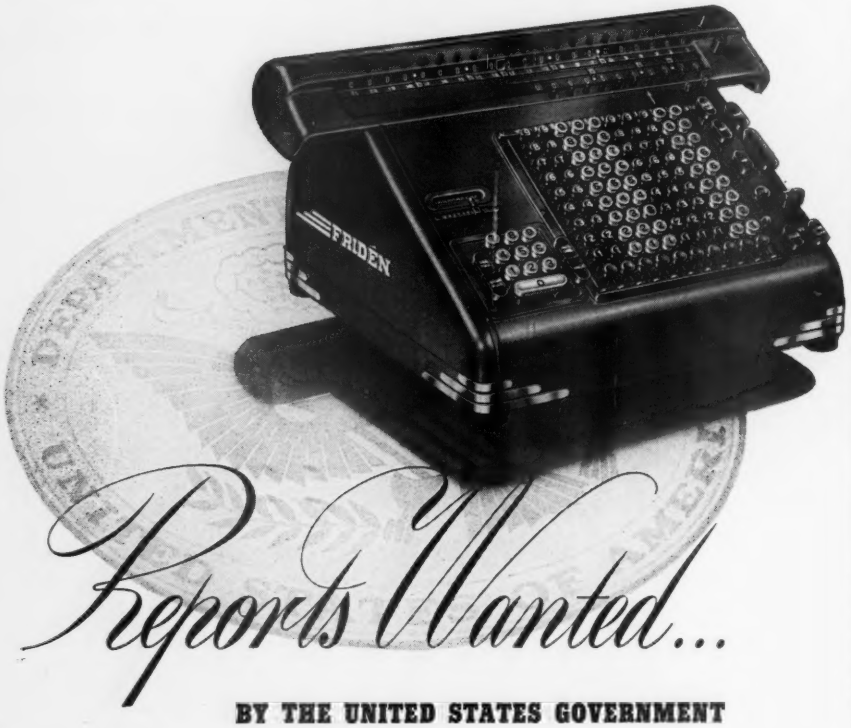
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear on the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

FREDERICK H. ZURMUHLEN,
Business Manager

Sworn to and subscribed before me this 28th day of September, 1943. Marcellus E. Noels.

RADIO RIVETS PIN PLYWOOD . . . A new method of pinning stacked sheets of plywood together was demonstrated recently in the new RCA laboratory at Princeton, N. J. Operating on the principle of intense heat generated by high frequency, or short-wave radio, the "radio" nail is claimed to be an efficient substitute for metal and nail staples. The "radio" nail requires no holes. Intense heat is generated, melting the glue in a narrow path of the beam which attains several hundred degrees Fahrenheit. This action produces spots of glue between each sheet that hold like pins. The operating machine has the appearance of a small fat-barreled pistol, and when operator wants to "nail" he presses trigger and a measured shot of radio power shoots through the wood to the bottom of the stack.

ASSOCIATION HELPS ORGANIZE POST-WAR INDUSTRY — National Planning Assn., non-profit research organization, brings industry, labor and agriculture together on task of organizing postwar economy to bridge transition by private enterprise from war to peace. Headed by such men as William L. Batt, who is also vice-chairman of the WPB, and Robert J. Watt, who is international representative of the AFL and a member of the WLB, the Association is reported as promoting group discussions in Washington and other localities between agriculture, business, labor and government groups. The organization is, in addition, aiding post-war planning by the issuance of a number of pamphlets on studies of various phases of post-war economy. Typical folders include: "Guides for Post-War Planning", "Business Reserves for Post-War Survival", "When Demobilization Day Comes," and the NPA also issues a monthly Public Policy Digest covering reports and activities of government and private agencies. Members desiring more information or copies of pamphlets may write to the Association's office at 800—21st St. N.W., Washington, D. C.



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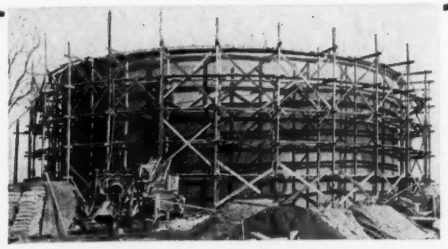

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The Present

Airplanes are actually made of mud. Because airplane wings are dug in an Arkansas mine, Reynolds Metals Company, the only aluminum producer who follows the entire odyssey of this metal, from ore to finished aircraft parts, has as slogan: "Out of the ground — Into the sky".

Three years ago, Reynolds, foreseeing the vital need for aluminum, entered production and created a whole industry. Before smoke cleared from the flaming wreckage on Hickam Field, Hawaii, December 7th, Reynolds' vast new plant at Listerhill, Alabama, had produced aluminum for 500 new bombers to avenge that "day of infamy".

90 percent of a military plane's weight is aluminum — and 80 percent of the aircraft engine itself is made of this flying metal.

Conjured Aladdin-like out of an Alabama cow pasture in five months and 28 days, the square mile of aluminum plant at Listerhill, with 42 acres of plant under roof, broke Hitler's slave-driven record of one full year to build an aluminum plant.

Listerhill is unique in the world. Bauxite ore goes in one end of the plant — finished aluminum sheet comes out of the other.

Consider the wing rib of a Curtiss P-40 plane — dime-thin, silver-bright, aluminum-alloy strong. It takes mud, men, money and the biggest hot rolling mills in the world to make the skeletons and skins of our fighting birds. The average unit in the U. S. warplane program, according to the War Production Board's Aluminum and Magnesium Division, contains 7½ tons of aluminum — one type of 4-engine bomber contains 17½ tons.

Aluminum is one of the commonest minerals in the earth's crust, but is hard to get out of chemical combination. The only practical source today is bauxite ore. Bauxite occurs domestically in Arkansas.

Bauxite arriving at Listerhill is crushed, dissolved under pressure in hot caustic lye, washed, concentrated, and shot up into huge 60-foot high precipitation tanks. The precipitate from these tanks after further washing travels through revolving, gas-fired kilns whence it finally emerges as a fine, dry-sifting powder — alumina, aluminum oxide, the stuff of which aluminum is made.

Alumina has an extremely tight chemical lock. To break the death grip between aluminum and oxygen atoms takes the full power of Muscle Shoals, delivered at five volts and 32 thousand amperes.

The fine alumina, fed into big, square electrolytic cells, is dissolved in molten cryolite, then split apart between powerful electrodes. Pure aluminum gathers at the bottom of the tank, is tapped off into huge ladles, carried to the cast room and poured into molds.

These virgin aluminum ingots, called "pigs", then move on to the 18 furnace cast house to be remelted and alloyed. In addition to the virgin pigs, the furnace is charged also with copper and magnesium alloying metals. The new pouring is cast into sheet billets. After these huge 3,000 pound slabs of strong aluminum alloy are scalped to clean surfaces, they are ready for rolling.

63 tons of rollers, operating more precisely than the most delicate Swiss watch, roll the huge chunk down from 10 inches to less than one-quarter inch thickness. The sheet finally emerges down the runout table in a broad gleaming ribbon of pure-clad sheet several hundred feet long.

When Reynolds entered aluminum production, he pioneered in two directions — producing aluminum from ore to metal, fabricating aircraft parts from metal to wings. Pure-clad sheets of strong alloy aluminum are fabricated into aircraft parts at Louisville. Under the hands of expert operators, stacks of pure-clad "skins" are cut on the routing tables at Reynolds Aircraft Parts Division like so much cloth. Precious trimmings and scrap — sometimes running to 90 percent, often to 60, and averaging well over 30 percent — is remelted at the aluminum source and back in production the same day!

Thanks to the Reynolds system, West Coast aircraft plants get their full order of precious aluminum in finished, government-inspected parts ready for assembly, instead of a shipment of sheet more than half of which might end up in plant scrap bins. A round-trip transcontinental freight haul for scrap is eliminated. One set of tools is used at Louisville by aluminum-wise experts, instead of duplicate sets of tools in each aircraft plant throughout the country. Although tools, manpower and metal are conserved — this Reynolds "reclamation" plan is tantamount to 30 percent increase of aluminum aircraft production.

This streamlined production of aircraft parts, though a boon to the U. S. at war, was not handed Reynolds on a platter. He went out and got it. A 1300-ton mechanical press, stamping out 10 foot plane parts 24 hours a day in Louisville, was found in an idle Detroit factory. The 600-ton hydraulic press turning out plane parts in the Reynolds Aircraft Parts Division was borrowed from the La Grange Prison in Kentucky. Hogsheads of aging tobacco were trundled out of steel-and-concrete storage warehouses to provide 200,000 square feet of floor space.

Manpower too is being converted—under a special training program for women. Aircraft parts work offers an excellent opportunity to women to get into vital war production. Women at Reynolds Aircraft Parts Division, stamp, route, drill and hand-finish and check the parts for our fighting planes. They are responsible for the quality of the actual aluminum pieces in the planes their sons and husbands in service will fly.

The Future

R. S. Reynolds entered aluminum production three years ago saying "this will be a light metals war". Today, in the face of much "postwar" timidity, Mr. Reynolds says confidently, "This will be a light metal peace".

"Our postwar planning goes hand in hand with during-the-war production. We feel a serious responsibility to keep our employees on their jobs. With that in mind, we surely intend to be going full-gun in the postwar world. The field of aluminum uses is so large already that we are considering how best to conserve our aluminum for the most strategic requirements of peace. In the construction industry alone, the uses of aluminum are myriad: panels for heat-radiating walls, combined insulation and fireproofing, gutters and flashing, roofing and shingles, window frames, screening, building hardware, venetian blinds, partitions, air-conditioning equipment.

"We, and the aluminum industry, and the aluminum industry's customers, are here to stay. If you think of aluminum as a wartime industry, you must think of aviation as a wartime industry, and of another vital element in our national organism — railroads — as a wartime industry too. That some of these were forged in the crisis of war does not argue that they can be dispensed with in peacetime. All of them are indispensable parts of our industrial aggregate.

"Recently I traveled with the executive of a great railroad. We spent three days calculating the effects of aluminum for use on the superstructures of refrigerator cars — which, as you know, travel from the far west to the northeast: trains loaded with fruits and vegetables, en masse.

"Our calculations proved that this one railroad with its associates would save $10,000,000 per year, since it could ship fifteen extra loaded cars per train without one cent of additional expense. Also, refrigerator cars, aluminum-designed, would require only one icing for its transcontinental run instead of icing every 150 miles. What is more, it indicated that to supply this one use would require every pound of the aluminum which our company is producing annually".

One of the largest specific applications of aluminum in postwar industry is expected to be the automobile field. Whole substitutions of aluminum for steel panels is one phase of this transition, while another phase is the engineering of aluminum into the car piece by piece, in engine parts, when whole substitution is refused. One careful estimate puts 500 pounds as the amount of aluminum in each passenger car of the future. In terms of the production of 5,000,000 passenger cars per year, "This in itself," one aluminum engineer points out, "would use up more aluminum than we are making."

"You may have heard weird tales of how aluminum will usurp the thrones of steel, of wood, and of fiber. Take my word for it, aluminum comes not as a thief in the night to rob and destroy. In the spirit of this new age that is dawning, aluminum comes bringing new magic of production that shall multiply the uses of service of steel, of wood, and of fiber. I propose, for example, the union of aluminum with steel, with wood, and with fiber that will enable us to do for the teeming millions of the tropics what artificial heating has already done for the frigid north. A thin coating of aluminum reflects 96% of the heat rays and opens up new fields of uses for steel, for wood and for fiber, such as the world has never known before. This is but one of the thousand new uses for this magic metal which has saved the freedom of the world and stands ready and eager to serve the world's peace."

Until Pearl Harbor, Reynolds was the largest roller of light-gauge metal in the world. He had just perfected a process for the application of thin aluminum foil thread of many colors and finishes to textiles. Launched at the end of the war, these textiles should consume a good deal of our augmented aluminum production; while the substitution of light, strong aluminum parts for heavier parts in textile machinery will be an important application in itself. New alloys recently developed by metallurgists at Reynolds' huge plant at Listerhill, near Sheffield, Alabama, have strength approaching that of mild steel. Lightness and strength are factors which will swing many engineer's designing into the employment of this new metal.

However, as President R. S. Reynolds says: "To be a good citizen oneself, one must recognize the problems of one's neighbors. To get the best out of aluminum, one must recognize the virtues of other materials. None of them is strictly competitive with another. They all supplement and enhance each other's values. The applicability of each is decided in terms of engineering, function, and design.

"There is in a sense a sort of democracy among metals as well as among men. In industry, all materials are 'created equal.' It's what they make of themselves and what the manufacturer can make of them that counts."